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THE MANAGEMENT OF EXOPHTHALMIC GOITER

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SAN FRANCISCO

There are two matters of chief concern to every patient who seeks medical attention. First, he desires relief of distressing symptoms and, second, an ultimate cure, if such can be obtained. Any temporary or permanent disability must necessarily be reduced to a minimum. In our endeavor to meet these just and natural demands of the patient who comes to us with exophthalmic goiter, there are certain primary considerations which must guide us in his treatment.

First and chief among these is that it must be recognized that so-called exophthalmic goiter is a disease whose etiology is as yet unknown. This fact renders impossible the prosecution of rational therapy and forces us to the employment of empiric methods. Rationality, however, should guide us to the extent which our knowledge of the pathologic physiology of this disease will permit. It is necessary to distinguish clearly between truly rational measures and those based on theories of causation. Empiric methods should be properly evaluated and not mistaken for cures or even rational treatment. Finally, it is essential to recognize that exophthalmic goiter runs a fairly definite course and in the majority of cases results in spontaneous cure. This fact is most important and should preface every report on the evaluation of therapeutic measures employed in this disease. Failure to recognize this fundamental principle has led to great confusion and uncertainty in the minds of most physicians as to the proper course to follow.

Since effective therapy depends on a knowledge of etiology, it is necessary to consider briefly the scanty facts so far revealed. As stated above, the ultimate, causative agent is unknown; but some of the predisposing and exciting factors seem fairly well established. First of these is the hereditary background, which forces itself on our attention in so many cases. For example, a young woman, her mother and one aunt have all come under my observation suffering from this condition. In many instances an hereditary nervous instability and endocrine imbalance seem to be the soil on which this disease develops. The exciting causes may be grouped under three heads: sex epochs, psychic trauma, and infection with its drain on the protective mechanism. It is desirable to establish, if possible, which of the foregoing immediate causes exists in any given case, since the subsequent therapeutic course and prognosis vary. For example, removal of a thyroid gland that is participating in the endocrine readjustment of puberty or the climacteric seems to violate principles of physiology. The relatively large number of cases that developed in young men in the World War may be taken as an illustration of the rôle sometimes played by psychic shock. The literature abounds in reports of exophthalmic goiter developing after acute infectious diseases, such as pneumonia, influenza, typhoid and the exanthemas. Equally numerous reports implicate focal infections as etiologic factors. In many cases, no exciting cause is ascertainable and the therapeutic indications are less clear.

THE HYPERTHYROIDISM THEORY

The term "hyperthyroidism" has been employed as a descriptive one because in many respects exophthalmic goiter presents clinical signs almost the antithesis of thyroid insufficiency or hypothyroidism. This name seems especially appropriate, since the condition is most often accompanied by an actual enlargement of the thyroid gland. Extensive use of this term, implying by its annotation, and the connotation which it developed, that the pathologic physiology was known, gave rise to a group of therapeutic procedures, mostly surgical, directed toward decreasing the activity of the gland. This plausible theory of hyperactivity, together with a palpably and visibly enlarged organ at the surface of the body which pathologists said was hyperplastic, suggested a method of treatment which was fully put to the test. Accordingly, all sorts of attacks were made on the gland; its blood supply was decreased, boiling water was injected into it, and finally varying degrees of thyroidotomy were performed up to subtotal thyroidectomy. When these procedures were rewarded with a fair degree of symptomatic relief, the theory of hyperthyroidism was accepted by many as proved. The term hyperthyroidism has become more firmly entrenched since the recent developments in basal metabolism. Unfortunately, it has become the custom to express the basal metabolic rate in percentage variations above or below a supposed normal instead of using absolute values as has always been done, for example, in recording body temperature. Quite naturally, the percentage above normal has been interpreted as measuring the degree of hyperthyroidism or even the amount of thyroxin secreted.

Failure to secure uniformly satisfactory results with methods based on this theory, together with an increasing number of clinical and experimental facts that defy interpretation on this basis, has cast much doubt on the validity of the "hyperthyroidism theory." Many observers are coming to believe that marked qualitative changes must also be presupposed in order to account for all the observed facts. Further details on these points may be found in Janney's [1] critique of the hyper-

1. Janney, N. W.: Concerning the Pathogenesis of Thyrotoxicosis, Endocrinology 8: 633-651, 793-809, 1922.

thyroidism theory with a review of the facts pointing toward qualitative disturbances in the thyroid secretion. Recent reports of the favorable results following the administration of iodin in the form of compound solution of iodin might be interpreted as evidence in favor of qualitative changes in the thyroid hormone. This clinical evidence, if linked with Marine's demonstration of the inverse relationship between amount of iodin and degree of thyroid hyperplasia and Kendall's work on the toxicity of the iodin-poor thyroxin molecule, might be regarded as very strong evidence in favor of a qualitative disturbance as contrasted with a quantitative change in the thyroid secretion. Fascinating as these separate facts are by themselves, and reasonable as is the theory into which they can be built, we are not yet able to convert hypothesis to fact, and hail iodin as a cure for this disease. With wider experience in its use and a longer time in which to observe its effects, we should obtain a proper estimate of its therapeutic value. Suffice it to say here that at least the tabu against iodin, instituted by Kocher and fostered chiefly by the proponents of the hyperthyroidism theory, has been lifted and a useful drug, whose limitations we should soon know, finds its place in the treatment of exophthalmic goiter.

MORBIDITY

Mortality statistics are very misleading, because mention of the time element is too often omitted. Nor is mortality the only consideration in treating disease. Morbidity is of more importance, at least from an economic standpoint. I have been impressed with the strong tendency of exophthalmic goiter to run a fairly definite course which it is difficult to shorten appreciably by any known means, including surgery and roentgen ray. Its duration seems to depend to some extent on the severity, which may be measured roughly by the height of the basal metabolic rate at the first crisis. The length of time varies from six months to three years, the average being from fifteen to eighteen months.

RESULTS OF VARIOUS FORMS OF TREATMENT

In an endeavor to escertain its average duration and the effect of different forms of treatment on exophthalmic goiter, I collected from the literature the data on 189 cases which had been followed for three months or over. Since the basal metabolic rate is universally conceded to be the most reliable single sign by which to estimate the severity of the disease, and since these data were recorded most often and were least influenced by the personal equation, they were used in this study. Nine hundred observations from eight published reports,[3] summarized in the accompanying table, and the records of thirty-five unpublished cases of my own, constitute the series, in which forty-eight patients were treated surgically, fifty-five had no specific therapy, and eighty-six received roentgen-ray irradiations. Only the totals for all forms of treatment are given in the table, but in Chart 1 the curves, smoothed once, constructed from the data for each type of treatment, are shown for comparison with one another and with the composite curve.

Mean Basal Metabolic Rates of One Hundred and Eighty-Nine Patients with Exophthalmic Goiter Observed from Three to Twenty-Five Months

	Month																								
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Number remaining	189	189	189	185	165	149	135	114	107	101	88	84	81	79	71	63	60	61	55	51	50	46	44	39	32	24
Number of observations	187	84	65	80	60	57	39	27	25	25	29	27	18	19	16	13	12	11	9	3	8	4	7	9	10	4
Mean	84	30	23	24	25	23	20	22	24	23	21	22	17	20	21	23	23	20	19	19	22	20	17	17	12	2
Smoothed Value	49	42	35	31	27	26	25	29	29	24	24	20	20	19	22	24	23	21	20	17	18	20	19	16	11	11

MORTALITY STATISTICS

The lowest mortality rate and the shortest duration of morbidity constitute the desiderata in the management of thyrotoxic patients. In respect to mortality, it is probable that the irreducible minimum in exophthalmic goiter is 1 or 2 per cent. But this is an ideal which by any method of treatment advocated to date has not been attained. The very best surgical results, until very recently, show a mortality of 4 per cent., which is no greater than obtains with any other surgical operations of equal severity, but is still twice the natural mortality rate of this disease. An excellent check on the natural mortality rate has recently been afforded by the investigations carried on at Mount Sinai Hospital [2] in New York, in which fifty patients were treated with no specific measures other than small doses of syrup of ferrus iodid administered in some cases. The mortality rate from exophthalmic goiter in these cases was 4 per cent. The number cured and improved compared favorably with the best results of surgical treatment.

These observations are of tremendous significance from a therapeutic point of view, for they establish the fact that, with moderate bed rest, small doses of iodin and symptomatic treatment there is a strong tendency toward spontaneous cure. With this fact in mind, one readily comprehends those cures which have been reported following administration of almost every drug in the pharmacopeia, to say nothing of dieting, rubbing, praying, adjusting, bathing, and what not.

There is one assumption made in the construction of such a curve; namely, that each patient comes under observation at the crest of the first wave of toxicity. In the majority of cases this seems to be so or, at least, treatment produces a drop in the rate. There are only eighteen cases in the 189 whose rates continued to rise after coming under observation. In keeping with the assumption made above, the highest rate in these eighteen cases was made to coincide with the first high rate in the other cases. Another assumption that is correct only in regard to the group that received no specific therapy is that all the patients in each group received only the type of therapy indicated by the group heading. Many in the surgical group had received

2. Kessel, Lee; Hyman, H. T., and Lande, H.: A Study of Fifty Consecutive Cases of Exophthalmic Goiter, Arch. Int. Med. 31: 433 (March) 1923.

3. The material was gathered from the following reports of the observers named: Means, J. H., and Aub, J. C.: Basal Metabolism in Exophthalmic Goiter, Arch. Int. Med. 24: 645 (Nov.) 1919. Means, J. H., and Holmes, G. W.: Roentgen-Ray Treatment of Toxic Goiter, Arch. Int. Med. 31: 203 (March) 1923. Kessel, Lee; Hyman, H. T., and Lande, H. (Footnote 2). Boothby, W. H., and Sandiford, Irene: Physiol. Rev. 4: 69 (Jan.) 1924. Lahey, F. H., and Jordan, S. M.: Boston M. & S. J. 190: 348 (April 7) 1921. Sturgis, C. C. (Footnote 1). Hyman, H. T., and Kessel, Lee: Exophthalmic Goiter, Arch. Surg. 8: 149 (Jan.) 1924. Kessel, Lee; Lich, C. C., and Hyman, H. T.: A Study of Exophthalmic Goiter and the Involuntary Nervous System, J. A. M. A. 79: 1213 (Oct. 7) 1922.

roentgen-ray treatment before, and in some cases after, operation; and all may be said to have received medical treatment prior to operation.

It is to be regretted that the same number of cases could not be found in which the patients received the different types of treatment, and records of the basal metabolic rates of every patient obtained monthly up to two years; but the number of observations is sufficiently large in each group to form a basis for comparison. In a majority of the cases, it is those patients who were very ill to begin with, or who did not show satisfactory improvement, who were observed the longest. From the table we see that half of the patients had dropped out of the series by the eleventh month, and we may assume that most of these were sufficiently improved to require medical attention no longer.

Regardless of the objections to such a graph, there are certain definite facts to be observed: The highest average initial rate, plus 58 per cent., was observed in the group treated by roentgen-ray irradiation, which fact we interpret as indicating that this treatment was administered in the most severe cases, perhaps being considered, in some cases, as poor surgical risks. The next highest average initial rate, plus 57 per cent., was in the surgical group, and the lowest, plus 44 per cent., was the average for those treated by no specific therapy, suggesting that the milder cases were so treated. The last assumption, however, is not entirely correct, for the majority of these cases were taken from the reports of Kessel, Lande and Hyman,[3] who took fifty consecutive cases, and among these were some with high initial rates.

Regardless of the method of treatment, a marked fall occurs in the mean basal metabolic rate, so that a low point is reached in from four to five months. But in each group there is a secondary rise, which both in height and elapsed time varies directly with the height of the basal metabolic rate at the first crisis. There seems to be a tendency toward a second recrudescence at about the sixteenth month. At the end of two years, after the apex of the first crisis, the average of all patients remaining in the series was approximately plus 10 per cent.

These observations seem to be in conformity with a recently published statement of Lewellys F. Barker,[4] which is quoted below because it so accurately describes my experience with this disease:

> The average duration of hyperthyroidism associated with diffuse hyperplasia of the whole thyroid gland is probably two or three years, no matter how you treat it (medically, surgically or radiologically). You may, it is true, compel a subsidence of the symptoms by treatment, but rarely a cure until this time has elapsed; moreover, after recovery from an attack, these patients are prone to recurrence in later life.

There seems to exist a general belief that surgical measures, especially subtotal thyroidectomy, will effect a cure if all other means fail, and that patients who are operated on do not have the recurrences to which Barker refers above, and which all clinicians know to occur not infrequently in patients who have once had the disease. In the last three years I have seen twenty-two patients who have submitted to surgery but continue to suffer from the same thyrotoxic symptoms that distressed them prior to operation. The basal metabolic rates of these patients ranged from minus 6 to plus 80 per cent. It must not be supposed that this group had not been skilfully operated on, for many of them had journeyed to the best surgical clinics in the country. Some had had bilateral lobectomy, and one had submitted to six separate operations on the thyroid. I have dwelt somewhat at length on the surgical aspects of the question because this form of therapy is best known to all, and the belief is prevalent that resort to surgery is always followed by beneficial results, and that the mortality rate is only 4 per cent. It must be remembered that this low death rate is attained in this country at only a few well known thyroid clinics, and it is probable that the operative death rate the whole country over is appreciably more than 4 per cent.

Nor is it to be assumed that the roentgen ray or any other measure always results in cure. Exophthalmic goiter represents a physiologic or functional disturbance in which both the endocrine and autonomic nervous systems participate. The thyroid function is only one of many that are deranged. All this evidence seems to indicate that this disease is not one of the thyroid

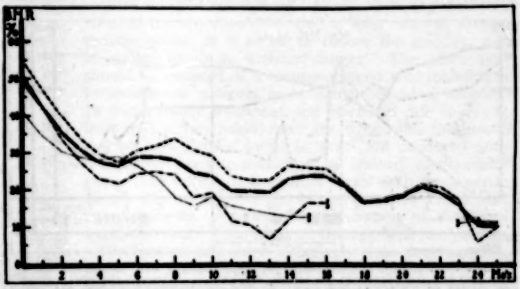

Chart 1.—The course of 189 patients with exophthalmic goiter is shown by the heavy line. This is a composite curve constructed from the data furnished by the three lighter lines. The higher "dot-dash" line represents eighty-six patients who received roentgen-ray treatment, the lower "dot-dash" line represents forty-eight who were treated surgically; the dotted line represents fifty-five who received no specific therapy.

sui generis, as neither gross nor microscopic changes in that gland are constantly present. For this reason, measures directed toward the thyroid alone can only result beneficially, so far as the thyroid participates in the disease. For this reason neither surgery nor roentgen-ray exposures of the thyroid can be regarded as curative. That these measures do not fulfil our hopes is evidenced by the facts, if one tries to judge them in an impartial light.

MANAGEMENT OF THE DISEASE

All this might imply a fatalistic point of view in which therapeutic nihilism figures prominently. But such is not the case, as will presently be shown, for there is much that can be done for these patients. Our aim should be to carry as many as possible through the course of their disease with as little strain on the nervous and cardiovascular systems as possible and restore the largest possible number to full social and economic usefulness.

Although it is a factor over which the individual physician seldom has any control, still it should be mentioned that it is desirable to put these patients under treatment as soon after the inception of the disease as

4. Barker, L. F.: Exophthalmic Goiter, Internat. Clin. 2:1 (March) 1924.

possible. It is extremely difficult of proof, but it seems reasonable to suppose that by proper attention prior to the first crisis, the toxicity and height of the basal metabolic rate can be materially lowered. Most patients appeal for aid near the height of the first wave of toxicity, when the signs and symptoms are most severe. I have observed a few who came prior to the crisis, and I have had the opportunity to watch the patient through this period. In the greatest majority of cases coming to us, the disease has existed for from two or three months to a year. The duration is difficult to ascertain because of the insidious onset that so often characterizes this malady.

Bed rest is necessary when the patient first comes under observation in order to obtain approximately basal conditions on which a satisfactory estimate of the severity of the disease may be made. The amount of rest should vary directly with the severity of the disease as measured by the toxic manifestations and basal metabolic rate. In severe cases, the weakness is such as to enforce bed rest. As the patient improves, more and more activity may be allowed, as these patients are restless and feel better if allowed to do something. I have carried patients through the course of their disease

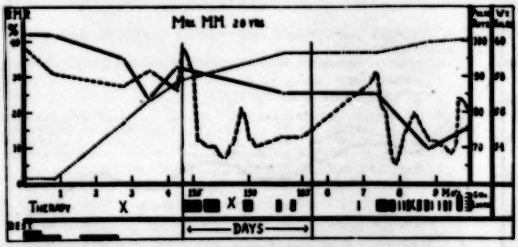

Chart 2.—The solid line represents the basal metabolic rate, the broken line the pulse rate and the dotted line the weight in kilograms. Although the basal metabolic rate showed an appreciable drop under roentgen-ray treatment and there was a gain in weight, still the morning pulse rate persisted high (from 94 to 100). After medication with 3 drops of compound solution of iodin daily, the pulse rate decreased to 72 in four days and remained low as long as the iodin was taken. With the exception of the first month, when there was a week or two of bed rest, this patient continued at her regular work, which was clerical in nature.

with rates as high as plus 60 per cent. who continued with their ordinary duties and recovered without cardiac damage. This is not desirable, however, but economically necessary in some instances. The statement that surgical treatment is an economic necessity in order to return patients to their occupations in the shortest possible time is subject to much doubt; but, even if accepted as true, it applies only to clinic patients, who receive free surgical treatment.

More important than rest in bed is avoidance of mental stress and strain, such as is occasioned by worry and responsibility. The social and economic aspect in these cases is most important because of the long duration of the disease. It is most necessary to avoid fatigue, both mental and physical, for the whole picture is one of an intoxication that is only augmented by the catabolic products resulting from work to the point of fatigue. In this connection we should stress the necessity of relieving constipation with its intoxication. McCarrison's theories on the etiology of exophthalmic goiter are interesting in this connection.

Loss of weight is a prominent feature, which is not difficult to prevent under proper management. Most patients have a good appetite; in fact, in some it is insatiable. As a rule, weight is regained when some attention is given the patient. The basal caloric requirements are easily ascertained by a determination of the basal metabolic rate. To a diet of this caloric value must be added a sufficient number of calories to balance the expenditure of energy during the day. It has been determined by Sturgis [5] that 84 per cent. must be added when the patient is in bed, just to balance the diet. Any additional movements call for a further increase, and, if it is desired to increase the weight, the caloric value of the diet must be again elevated. An increase of from 125 to 200 per cent. over the basal requirement is necessary in most cases. It is desirable and often possible to increase this to 300 or 400 per cent. so that the patient gets a diet whose value in the twenty-four hours is from 4,000 to 5,000 calories. Some patients experience periods when the appetite is poor; but increased appetite is the rule, and practically all patients reach the stage when they can eat. The aim should be to maintain the normal weight of the individual or the standard weight for the patient's height.

One of the symptoms most frequently complained of and the one most distressing to the patient is palpitation. Palpitation seems to be a manifestation of the part played by the autonomic nervous system. The heart rate and pulse pressure are always increased, and approximately in proportion to the basal metabolic rate. This rapid and strong heart action of which the patient becomes conscious is most distressing and calls for relief. The most useful drugs in this connection are quinin hydrobromid or quinidin. The former has an additional sedative action on the nervous system, owing to its halogen radical, and is useful in mild cases. It is probable, however, that the chief benefit, as far as the heart action is concerned, is produced by the quinin radical. For this reason, quinidin has proved very useful in the heart hurry of exophthalmic goiter. I have used it successfully in other types of tachycardia associated with nervous manifestations, such as premature ventricular systoles in young people, and have noted an equally beneficial result in thyrotoxic cases. There is some experimental work to show that quinin may influence the iodin content of the thyroid gland.

At this point it should be mentioned that one of the chief aims in the management of this disease is to prevent myocardial damage, which leads to decompensation and is the one residuum of this disease which is most distressing and from which there is often no recovery. I am of the opinion that this results chiefly from the additional work thrown on the heart in maintaining a greatly augmented rate of blood flow for a long period of time, often years. This increased blood flow is made necessary by the increased oxygen consumption, and is proportional to the basal metabolic rate and pulse rate. A toxic myocarditis of varying degree is a factor in some cases, but the great variability among patients as to ability of the myocardium to carry them through this disease suggests that the chief factors are the specific, congenital ability of the heart muscle in that individual, together with the amount of work thrown on it. Tachycardia, which is

5. Sturgis, C. C.: Observations on One Hundred and Ninety-Two Consecutive Days of Basal Metabolism, Food Intake, Pulse Rate and Body Rate in a Patient with Exophthalmic Goiter, Arch. Int. Med. 32: 30 (July) 1923.

always at the expense of the diastolic rest period, when continued over a long period of time, uses up the cardiac reserve, which varies considerably in different individuals. It is at times necessary to institute measures to combat decompensation, such as the administration of digitalis, during the course of the disease. But these do not differ from the treatment of myocardial insufficiency with decompensation from any other cause.

It sometimes happens that the patient will be found at the first examination already to have auricular fibrillation. The prognosis in such cases developing fibrillation early in the course of the disease is unfavorable for recovery. On the other hand, one frequently sees patients with a history of exophthalmic goiter in whom signs and symptoms of thyrotoxicosis have existed for years and are still present, but who have neither subjective nor objective evidence of myocardial damage. An illuminating report on this subject from the Mayo Clinic[6] summarizes in part as follows:

> From a study of the data presented in this paper, the most outstanding fact is the infrequency in both exophthalmic goiter and adenoma with hyperthyroidism of symptoms indicating cardiac disease; only one fourth of the patients had auricular fibrillation, and in less than one half of these was the fibrillation a constant phenomenon; about one fifth had, as evidence of slight cardiac weakness, a moderate degree of edema of the legs, which disappeared readily under treatment with rest and digitalis. Not more than 2 per cent. of the patients had sufficient clinical evidence of myocardial injury to classify them as having serious cardiac disease.

The danger of serious and permanent cardiac damage is often used as a reason for early and radical surgical intervention, but full knowledge of all the facts will probably show that the danger is much exaggerated. Cardiovascular damage is a more constant and prominent feature of "adenoma with hyperthyroidism" than of exophthalmic goiter. It is probable that failure to distinguish between types of thyroid disease has given rise to the opinion that myocardial degeneration is a frequent complication and sequela in exophthalmic goiter.

The exhibition of iodin in this disease is the only medication that might be regarded in the light of specific therapy. Since the admonitions of Kocher against giving iodin in so-called hyperthyroidism, physicians have been fearful lest the hyperactive gland be whipped up to still greater activity by this element. This is one of the unfortunate results of accepting an unproved theory of causation as a basis of therapy. Iodin in various forms has been used in times past and advocated by a few courageous physicians, with varying degrees of success. With the growing tendency to view this disease as representing probably a qualitative change in the thyroid secretion, the giving of iodin has become more popular. An impetus has been given recently to iodin administration by reports coming from the Mayo Clinic. Its chief use there has been to prepare patients for operation, and by its use the postoperative crises have been eliminated and a heretofore unattained low mortality rate has been achieved. From their published reports, a drop in the metabolic rate to a point approximating normal is obtained before operation. Patients who formerly were regarded as poor surgical risks seem to be converted now into excellent risks, and the mortality rate is such as might be expected in operations of equal magnitude on normal subjects.

Equally beneficial results may be obtained with iodin in the nonsurgical treatment of exophthalmic goiter, and its use is advocated. The response varies in different individuals and a few do not tolerate it, while others show marked improvement. The beneficial results will be manifested by early abatement of those symptoms which may be interpreted as due to toxemia. Decrease in the pulse rate is usually the first objective sign. Subsidence of tremor and a subjective feeling of well being are often noted, together with a drop in the basal metabolic rate. Chart 2 shows a striking decrease in pulse rate under the administration of iodin, though, in this case, it was not accompanied by a simultaneous lowering of the basal metabolic rate. Compound solution of iodin is recommended by the Mayo workers. Potassium iodid may also be used. If compound solution of iodin is used, from 3 to 5 drops a day should be the initial dose to test the individual's tolerance. This may then be increased to from 10 to 12 drops daily.

My views on the value of roentgen-ray irradiation have recently been set forth elsewhere[7] in detail and require no elaboration here. Suffice it to say that this form of therapy should be tried in most cases of exophthalmic goiter, as it seems to reduce the toxicity, and in skilled hands is without danger. The same skill should be required of a roentgenologist who undertakes to treat these patients as is demanded of a surgeon. In roentgen-ray treatment, the mortality rate is nil; at least it is not increased over the irreducible minimum, and no myxedemas, burns or scars are produced with the present technic employed by trained roentgenologists. The period of treatment varies with the severity of the disease and should be persisted in from four to six months, with monthly estimation of the basal metabolic rate. This form of therapy will not prevent recrudescence any more effectively than does surgery, but it has the added advantage that the patient is still under supervision and realizes that treatment must be persisted in until he is sufficiently recovered to require medical attention no longer. No difficulty has been experienced by us in keeping the patients under observation, for the situation is explained before treatment is instituted and the time element stressed. The halfhearted pursuit of this method has led to its incorrect evaluation by the profession and to unsatisfactory results to the patient. In more than fifty cases treated at St. Luke's Hospital in the last three years, there have been no deaths from roentgen-ray irradiation alone. While no myxedemas have resulted from our roentgen-ray irradiation alone, three have occurred in patients who have been operated on after roentgen-ray irradiation had been started.

Surgery must be resorted to in cases of mechanical obstruction, such as a substernal thyroid participating in the exophthalmic goiter, and severely toxic cases that show little or no improvement after from four to six months' trial with other measures. I have been fortunate in not having encountered any that failed to improve sufficiently under other methods as to render surgery necessary. From consideration of the natural course of the disease, it is obvious that the most opportune time for surgical intervention is after the patient has passed the crest of a wave of toxicity. This fact has long been recognized by surgeons who have taken

6. Willius, F. H., and Boothby, W. M.: The Heart in Exophthalmic Goiter and Adenoma with Hyperthyroidism, M. Clin. N. A. 7: 189 (July) 1923.

7. Read, J. M.: Roentgen-Ray Therapy in Thyrotoxicosis: Its Effect as Measured by the Basal Metabolic Rate, California State J. Med. 22: 10 (Jan.) 1924.

advantage of it, thereby reducing their mortality rates and at the same time gaining prestige for surgical treatment.

SUMMARY AND CONCLUSIONS

Exophthalmic goiter is a disease of unknown etiology, which runs a natural course of long duration which it is difficult to shorten very appreciably by any known means. The aim of all therapy should be to carry the patient through its course with the maximum of comfort to the patient and as little permanent damage as possible. It must not be forgotten that the most serious of the sequelae is myocardial insufficiency, which may develop in untreated severe cases, but is not encountered as frequently as we formerly believed. The rest, reduction of toxicity, and cardiac support are all aimed at avoidance of this distressing aftermath. The judicious administration of iodin may, in many cases, prove as effective as any other single means of reducing toxicity and slowing the pulse rate. In addition to the time element, which is the most important single factor in effecting a cure, the most effective measures are, in order of their importance, (1) rest, both physical and mental; (2) roentgen ray; (3) iodin; (4) symptomatic therapy, of which quinin hydrobromid is very effective, and (5) in a very few cases, surgical intervention, the type varying with conditions.

If assent is given to the views set forth above, a logical conclusion follows: namely, that no patient suffering from exophthalmic goiter should ever be allowed to pass from the supervision of the internist. To draw distinctions between medical, surgical and radiologic treatment is merely splitting hairs. Premature classification of a disease as a medical or surgical condition before its etiology is discovered will lead to dissatisfaction in the minds of both patient and physician, especially the former. Both surgery and radiology are therapeutic weapons which the internist may employ as occasion arises. Individualization is the key to successful treatment. The situation is much the same as it is in regard to another disease of unknown etiology, namely, peptic ulcer. In both, stereotyped therapy will be unsuccessful in a large percentage of cases and the patients, still suffering, will seek further aid, and to the surgeon will come the medical failures, and to the internist will go the surgical failures, each specialist receiving the impression that the other type of treatment results largely in failures and his own results chiefly in cures. It is necessary to maintain an open-minded attitude toward the therapy of exophthalmic goiter, always recognizing that at present it rests on an empiric basis. Not until the etiology is established will it be possible to employ rational therapy in the treatment of this disease.

1183 Flood Building.

Thyroid Toxemia Causes Auricular Fibrillation.—Auricular fibrillation is one not infrequent result of thyroid toxemia. It may result from toxic adenoma or from exophthalmic goiter. In toxic adenoma it may disappear when the adenoma or adenomatous masses have been removed. In exophthalmic goiter it may disappear temporarily when vessels are ligated, or when one lobe has been removed. When sufficient of the second lobe has been removed it may disappear spontaneously and permanently, or it may require the administration of some quinidin before this occurs. When one lobe alone has been removed, quinidin has not been capable of holding the heart regular. In two cases in which auricular fibrillation has disappeared, occasional premature contractions occur.—Dunhill, T. P.: *Brit. M. J.* 2:612 (Oct. 4) 1924.

THE OPHTHALMOLOGIST AND THE PSYCHONEUROSES *

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The relation between ophthalmology and the functional nervous disorders is obvious to many ophthalmologists. But the fact that we have been invited to discuss it here shows that there is a feeling that perhaps this relationship is not realized in its full importance. This opportunity to emphasize some of the more outstanding features of that relationship is most heartily appreciated. We have occasion to see a very appreciable number of persons whose problem might have been benefited materially by a different method of handling on the part of the specialist in whose hands they have been, so we welcome any chance to contribute to the specialties whatever means we can that will make for better understanding.

First, what are the "functional nervous disorders?" They are known as the psychoneuroses or neuroses. More specifically, but entirely inappropriately, they are known as "psychasthenia," "neurasthenia," "nervous exhaustion," "nervous breakdown" or just "nervousness." They are much more common than is generally realized, and cause symptoms of almost every disease. It has been estimated that there is a distinct complicating psychoneurotic element in at least 80 per cent. of all illness. That does not mean that "nervousness" causes the disease, but it does mean that there is a "nervous" element that must be reckoned with if adequate treatment is to be effected. And there is a very definite proportion of illness that is almost entirely caused by "nerves"—and the symptoms in these illnesses are often hard to differentiate from symptoms of organic disease. These psychoneuroses, then, are disorders of the nervous system giving rise to recognizable physical signs and symptoms, but without an adequate physical cause. There is limitation of the individual's usefulness, ranging anywhere from a mild handicap to complete invalidism. This limitation has been caused primarily by lack of knowledge, in particular in the individual, and in general in the other persons with whom he has come in contact. It has not been caused, popular belief to the contrary notwithstanding, by wilfulness or lack of "will power" or a "yellow streak." It is true that there are certain constitutional factors that enter into the make-up of the psychoneurotic, which give him "the neurotic risk." But it is equally true that these same factors, when handled with a reasonable degree of skill, are tremendously valuable, and contributory to the progress of civilization.

The one universal factor that can be taken for granted in every case of the psychoneuroses is sensitiveness. It constitutes a large part of the "neurotic risk," and is that normal, inborn quality, existing in probably a very large proportion of individuals which causes one to react sharply to pleasant and unpleasant contacts; but which, when not intelligently evaluated, makes one overreact to these factors. It is a "valuable risk." When understood and well managed, it is the asset that it should be; but, because of its very nature, when it is misunderstood and mismanaged, it becomes hypersensitiveness

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and thus a liability. The sensitive person, then, is potentially a psychoneurotic, but he does not become such unless through clumsy management he develops hypersensitiveness.

There is another factor nearly as universal; but not playing quite so large a part in every case, and that is suggestibility. This is another normal inborn quality. It makes it possible to accept uncritically as truths propositions submitted without evidence. As all know, in its normal balance it is what makes possible, from childhood on, the acquirement of much of our information. Of necessity we have to, and do, accept a great deal of information without investigating its merits, simply because we believe the source to be authoritative. Like sensitiveness, it is in itself useful, and if it is increased beyond a certain point it is harmful. It is most harmful when it is allowed to play on bodily sensations and mental manifestations, attaching these to misinformation gleaned from the illnesses of friends, or read about in the paper, or from "patent medicine" advertisements, and this is the use to which the psychoneurotic is apt to put it.

A third factor is by no means confined to any particular type of illness or any especial type of individual. It is an enemy to accurate thinking and effective behavior, and is so often a process that constitutes a distinct obstacle in the path of the psychoneurotic that it deserves mention. This process is rationalization. We all feel it necessary to have satisfactory reasons for our opinions, our beliefs and our acts, and we knowingly or unknowingly assign such reasons as will satisfy us. They may be the real reasons or they may not be; but, in either case, unless we are of an inquiring turn of mind, they tend to satisfy us. But when the real basis for any of our opinions, beliefs and acts is founded on feeling, such as prejudice, fear or resentment, and we insist that the basis is intellectual, we are guilty of rationalization. That is, we are assigning an untrue cause and blinding ourselves to the actualities of the human make-up. We all have certain basic ideas of self, and no one likes to think that he is the kind of person who would fool himself; so, in general, we are not apt to recognize our own tendency to rationalize unless we know of this process and keep a skeptical and watchful eye open for it. Even then, it is not always easy to admit it. When some one opposes a pet theory by an opposite one, our angry reaction to frustration is easily rationalized to be righteous indignation in the cause of truth.

ATTITUDE OF PHYSICIAN TOWARD PSYCHONEUROSES

Now, the psychoneurotic is not a creature apart from the rest of human beings, and he does not like to think that he is fooling himself. If he has explained his failures to himself on a basis of physical disease, he is not apt to like having them explained as being caused by "just nerves." When this feature enters into the picture, it serves as an active entrenching tool, tending to make very effective defenses against rational explanation of nervous symptoms. A definite antagonism is encountered that is often very difficult to deal with, and not infrequently the physician forgets that this is merely a symptom of the disorder and, instead of meeting it professionally, he reacts personally and allows his own prejudices and antagonisms to destroy his effectiveness. Thus, the road to recovery is filled with barriers and pitfalls that should not be there.

If we have in mind that all these factors exist in a very large proportion of human beings—so large a proportion that it is preposterous to call them abnormal—and that some persons are so constituted and have been so played on by circumstances that these factors come to play too large a part, then we shall approach the problem of the psychoneuroses with a somewhat different attitude than the usual one of prejudice and intolerance. The latter attitude does harm no matter what it is aimed at, and it has done incalculable harm and caused no end of unnecessary suffering because it has long been the prevailing attitude not only of laymen, but of many in the medical profession. Small wonder that we see people driven wholesale to adopt pseudo-religions and pseudosciences, where they at least find sympathy and a degree of comfort even if they do not find truth. It is only by our better understanding and by adopting a dynamic attitude that recognizes not only the preventability but also the curability of the functional nervous disorders that we as physicians, no matter what branch we are in, can fulfil the opportunities and obligations of our craft. Not that we should turn ourselves away from the physical causes of nervous disturbances and abandon the search for a physical etiology; but, most emphatically, in our hunt for the physical we must not forget for one minute the fact that in that body resides a mind, and that the mind is the most important element in the individual.

It does not require any imagination to see where the specialist comes in. One does not have to be reminded that the nervous system extends in its arborizations to every part of the body—so that it enters into the consideration of every field that the medical practitioner can concentrate on. Unfortunately, many of us do have to be reminded that even the most remote ramifications of the nervous system are connected with its higher levels and that there is an interaction between them. Not infrequently we find the followers of the illegitimate children of medicine and massage having a greater understanding of this humble fact than their supposedly more intelligent brothers who follow legitimate medicine. So in whatever specialty we may be, there is room for further understanding of the individual's controlling and guiding mechanism, his mind.

There is much writing of a medical nature about all parts of the human being, but today probably there is more written about the mind than about any other of his departments. The writers may or may not be medical men, they can qualify by an active and avid interest, and after they have devoured the writings of some school or other and conducted an investigation to prove that school right or wrong, they are well on the way toward achieving recognition. There is so much of a conflicting nature that we hardly know which way to turn. And there is so much still left unsolved that constant search is desirable and necessary, and this mass of observations has to be allowed free expression—out of it will come, sooner or later, further illumination and advance. But it is not necessary to wade through literature to understand human nature—it can be acquired by any one of reasonable intelligence who has much to do with people, by using patient, open-minded and unprejudiced observation. We cannot afford to be so busy that we neglect opportunities for a more complete understanding of our fellow beings. It is the especial province and opportunity of the medical man to treat human ills, and that opportunity is too frequently not fully accepted. There is too much of the feeling that a specialist must not infringe on

the patient's affairs. Perhaps, in some cases, part of the reason for selecting a specialty is to avoid the necessity of having to deal with wider problems, problems that affect the entire human being. And then again it is true that many people do not expect the specialist or even any physician to go into their private affairs. But that need not be the basis of a comfortable rationalization, absolving the physician from a responsibility that is his. Perhaps the least he can do is so thoroughly to acquaint himself with types of individuals and their behavior that he will be better able to place the emphasis on the right, rather than on the wrong place, and thus not unnecessarily overvalue relatively unimportant symptoms. We are all prone to slip into the fallacy that our own special field is the most important one for the welfare of the individual. But is it not comparatively rare to find a disorder confined to any one body function?

PSYCHONEUROTIC EYE PATIENTS

How often do we find patients complaining that the use of their eyes affects some comparatively remote portion of their body? We not infrequently find that there seems to be a connection between the eyes and "stomach" sensations, often called "indigestion," that are hard to explain on any other basis than that of a conditioned reflex. We are all familiar with ocular disturbances, such as scotoma, amblyopia and blurring of vision, that come as part of the general effect of digestive upsets; so, perhaps, we accept the converse as true too. We need not doubt that the sensations in the former conditions exist, except, of course, in the malingerer; but in many cases it is fair to doubt their necessity. Because our eyes get disturbed by "indigestion" it is not necessarily true that we must get indigestion from use of the eyes. And yet it is not uncommon to find that this is considered to be the case. It is usually in a sensitive person who has worn glasses for a long time and has been oversensitive to his ocular sensations. He has been overemotional for some reason, and gotten into a condition of general malfunction. He must go to have his eyes reexamined, and perhaps a slight change is made with due form and ceremony, and his gastric symptoms disappear. Such is the power of suggestion. Have we recognized him as a psychoneurotic or has our own suggestibility played us false?

There is an appreciable number of patients who come frequently for a correction in their glasses. The lenses that suit them vary from time to time, so that it seems legitimate to change them and inadvertently impress their possessor with the idea that his eyes are quite unusual. We know of an eminent scientist who thus had to have his glasses changed many times. His reputation for intelligence was of such a high order that it effectively threw a smoke screen around this particular psychoneurotic hypersensitiveness and prevented more appropriate treatment, if not actual recognition of the real cause of the disturbance. Perhaps there are a few cases in which the hypersensitiveness has to be indulged, but they are rare. It is our conviction that a better understanding of the nature of his symptoms makes the patient a happier and more useful person because he becomes freed of some useless impedimenta. By being too indulgent toward the patient's conviction of the validity of his symptoms when there are not adequate grounds, we do harm, not good. We may relieve discomfort temporarily, but we help to fix a neurotic habit of mind that is apt to extend, if it has not already extended, into other fields and thus seriously handicap his behavior. Why feed a neurosis when there are extensive ideas of inadequacy and an extreme desire to escape from legitimate family and social responsibilities by allowing the individual a partial but false sense of security in the disguise of a pair of glasses? Dr. W. H. Wilmer [1] says:

> In a very small number of aggravated cases, the contented psychasthenic finds the inability to use the eyes a great protection against the disagreeable necessities of life, and no real effort is made to change conditions. The eye disability is a ready help in case of trouble. . . . A little patience, frankness and free discussion of the patient's condition will help to stabilize and to stop the tour of the offices of ophthalmologists in quest of newer and more helpful glasses. The following quotation has helped me with many neurotic cases. I cut it out of a medical journal some years ago: "The movements of the body machinery do not often rise into the consciousness of the normal man, but are a continuous moving picture show to the neurasthenic." I advise them to give up the moving picture show of infinite subjective eye symptoms.

The ophthalmologist who is alive to the situation and who has a broad desire to be of the greatest possible benefit to his patients will not necessarily attempt elaborate psychotherapeutics, but he will be able to recognize when psychotherapeutics are necessary and by his friendly common sense prevent further development of unnecessary handicaps, or he may be in the enviable position of such early contact with a budding neurosis as to prevent its further growth. Probably the general practitioner is the one who should first detect the potential psychoneurotic. As Osler says, "The 'irritable eye,' the so-called nervous or neurasthenic asthenopia, is familiar to every family physician." But it is by no means unusual for the ophthalmologist to make the first medical contact, because examination of the eyes is fortunately a common procedure. Thus, he often has a rare chance, by timely advice, to prevent at least some degree of invalidism.

THE NEUROTIC CHILD AND ADOLESCENT

Dr. George Derby [1] writes that he sees patients under 10 years of age whose eye symptoms seem to be principally neurotic "quite frequently," and feels that, between 10 and 20, neurotic disturbances are not so frequent as before or after. Dr. Harold Gifford [1] writes that he sees such patients in the first two decades "fairly often," and Dr. Arnold Knapp's [1] impressions are that "young girls in early school life, about 12 years of age, suffer from hysterical amblyopia, principally defined by the functional contraction of the field, and that young people, both males and females, around 20 have a great deal of difficulty in the use of their eyes, accompanied by nervous symptoms. It seems to me that muscular anomalies, which mean errors of convergence, are more important than refractive errors. It is a striking fact that as these people get older beyond middle age the muscular conditions adjust themselves." We believe that the ophthalmologist who says that he rarely if ever sees cases in the first two decades of life whose eye symptoms can be considered principally neurotic either does not see many young patients or is not fully aware of the nervous organization of the human being and the possible extent of involvement of the eyes in general functional nervous disturbances in young people. It is in these two plastic decades particularly that useful and harmful habits are established, and any one who can be instrumental in the prevention of bad,

1. Personal communication to the authors.

and the formation of better, habits of thought and action has made a genuine contribution. It is with these cases that the most constructive work can be done, because they have not become too fixed. They are worthy of very special consideration.

It may not be necessary to point out how the neurotic child and adolescent can be recognized; but, at the risk of repeating something already known, we are going to do so. In the first place, by his behavior. In the second decade we see an elaboration of the signs that are self-evident in the first, and it takes a little more experience and skill to discover them because protective and defensive mechanisms have been set up to compensate for the oversensitive points. The child under 10 will be difficult to manage in the office and will often tax the examiner's patience to the utmost. He will fail to cooperate either because of an excessive shyness or because of an extreme antagonism. That type is easy to label. Another child will be docile and cooperative but perhaps unduly apprehensive. A simple interrogation of the parent will reveal that there is a high degree of dependence and a lack of natural adventuresomeness in the child. His tastes lead him into well protected activities, and he does not like to play with other children as well as by himself. He may show an unusual interest in his feelings and be too ready to consider himself sick. He is apt to show signs of vasomotor instability, such as ready flushing of the face and moist hands. And he may even show the signs of marked fear—trembling, fast breathing and dilated pupils.

With older children and on up through adolescence, it is only the exception that behaves in a markedly uncontrolled fashion. Unless he has been grossly spoiled, he has learned by experience that he will get along better by submitting reasonably to examination. But he may be irritable or excessively casual or bored. On the other hand, he may still show general apprehension and undue interest in his condition. Here, again, when it is possible, the parents can often give one valuable assistance in forming one's estimate as to the degree of the "nervous" element present. The most valuable evidence is, of course, the comparison of the actual findings with the extent of the symptoms. And often when it has been concluded that there is probably not adequate physical cause, further evidence can be obtained by the way the patient responds to treatment. So it is desirable to follow him up and not simply prescribe a pair of glasses and bid him good-bye.

Probably more glasses are prescribed for persons under 20 than for persons above this age, as it is in the first half of this period that concentrated use of the eyes begins, and in the latter half there is apt to be increasing use of the eyes, often under adverse conditions that serve to bring out minor defects or cause functional incapacities. It would be interesting to know, but hard to find out accurately, just how many of these glasses are really necessary. We know, as do many of our readers, that there is definitely too much prescribing of glasses, unsupported by constructive advice, just as there is definitely too much similarly unsupported prescribing of medicines. Some ophthalmologists write a prescription for every one who consults them, just as many a medical man would not allow a patient to leave his office without an order on a drug store. We have evidence of this from the thoughtful and careful men who relieve a considerable number of patients from the burden of glasses put on them, maybe years before, by a less conscientious member of the craft; and also from the quacks who throw away all glasses and get sufficient success to make us stop and think. It is easier to write a prescription because most people expect one, but no one who has the privilege of a degree in medicine ought to be guilty of taking the easiest way, which, in the long run, simply increases the burdens of humanity.

CONCLUSION

From what has already been said, it can be seen in part how the ophthalmologist and other specialists, too, can be of great assistance in preventing unnecessary invalidism. Perhaps only 5 or 10 per cent. of his patients are essentially neurotic and their symptoms explainable by their neurosis. Even if the percentage is as small as this, it is sufficiently high to warrant a thorough understanding of the best type of approach. If just a little more patience, a little more open-mindedness and a little more determination will raise our batting average, surely it is worth while. And there is a tremendous satisfaction in taking hold of a case that has gone the round of physicians with pitifully little or no benefit, and, by sensing the real trouble back of the symptoms, effect genuine improvement and even cure. It may not be an easy game, but it is a good one and has its rewards.

Aside from this relatively small number of patients in whom the prime obstacle is their neurosis, there is a larger group in which the neurotic element enters in sufficient degree to necessitate its treatment. This group has been estimated by ophthalmologists as comprising from 10 to 20 per cent. of those coming to their offices.

Then, by conservative estimates, from 20 to 30 per cent. of patients give evidence of being neurotic, or of having the neurotic liability. If a better knowledge of human nature is going to make for better treatment of all of these cases, there is added reason for making a genuine effort to understand them and make more effective contacts with them.

With some ophthalmologists, the treatment of the person himself, apart from the treatment of his eye troubles, could not be improved on. But it is our conviction that, in general, if more thought were put on the personality behind the eyes, there would be fewer glasses prescribed, and many of the people who properly wear glasses now would not be using them as comfortable excuses for failure to meet the necessities of reality.

ABSTRACT OF DISCUSSION

DR. EMORY HILL, Richmond, Va.: We shall no doubt all admit that a neurotic element enters into the complaints of many patients, and this element must be considered in evaluating the importance of these complaints and treating the patients. We may differ as to how the psychotherapy is to be administered and by whom. My feeling is that the chief value of an intelligent appreciation of the psychoneuroses by the ophthalmologist is to enable him to decide when his duty to his patient has ended, and more effective and welcome advice is to be sought from the family physician or neurologist. Two considerations enter into the problem: 1. The ophthalmologist is dealing with a very definite matter of ocular defects which he can correct, or cannot, according to the case; at least, he knows what can be done toward the remedy of a refractive error and macular imbalance and weakness. 2. The patient very rarely desires or accepts questioning and advice as to the intimate affairs of his (more often, her) psychic life from the ophthalmologist. Our best intentions are not appreciated in

this regard, and the result is usually a failure unless the exceptional personality of the physician gains a little success. As the authors state, an exhaustive psychanalysis is beyond the scope of the ophthalmologist; indeed, if we spend the time that would be required for any thorough study of the psychoneuroses in doing the best possible refraction, we shall do the best possible service to our patients; and as a result of this thoroughness, after certain studies have been made and our patients have persisted a few weeks in following our instructions, we shall be able to say with great positiveness that the eye treatment is ended and all the relief obtained that is possible from the ophthalmologist's care. Thus, the extent to which the eyes can be incriminated will be settled and further help suggested from one competent to treat the psychoneuroses. As to how many glasses will be discarded, I cannot say. I know of no way of foretelling with certainty what error of refraction does, and what does not, cause symptoms. The proof is in the wearing of the glasses; and wearing glasses that accurately correct errors of refraction will surely do no harm. I am inclined to think that the patient who finds refuge from his responsibilities behind a pair of glasses will find some other refuge if his glasses are taken away. I feel the need of more constant association with medical man and neurologist in order to know better the relative importance of the eye conditions which seem to cause symptoms, especially in the so-called neurotic patient.

Dr. George S. Derby, Boston: This paper is of exceedingly great value to the ophthalmologist. I believe they are quite right in the estimate they have obtained that in from 20 to 35 per cent. of those coming to our offices the neurotic element enters into the case to a sufficient degree so that treatment is necessary. How shall we handle these cases? I believe that the first requisite is a very careful history. In most of these cases, the history is more important than the examination of the eyes. A careful history inspires the patient's confidence and frequently gives the clue to the trouble for which we are looking. A hasty interview may only disclose that the patient has pains in his eyes if he uses them for more than a short period. The examination may show a low degree of uncorrected astigmatism or perhaps a variation of from 10 to 15 degrees in the axis of the weak cylinder he is wearing. The patient is got rid of, relieved or unrelieved; his glasses are changed, but he soon reappears and subsequently goes to another ophthalmologist. A more careful history might have shown that the patient's father had been blind for many years, that he feared blindness himself, and that his train of symptoms rested entirely on this fact. This is only one of many types of neurosis which we meet frequently in our practice. These patients cannot be disposed of in twenty minutes or half an hour if we are to do them justice, and we should not take them unless we are willing to give the time they require, often at a financial loss to ourselves. No less important than the history is a very careful examination to make sure that no essential feature of the case has been overlooked. Having decided in our own minds that the condition is a neurosis, I agree with Dr. Lunt that the ideal method is a frank talk with the patient, trying to explain to him the underlying cause and trying to change his mental attitude so that he may see the way to help himself and thereby arrive at a cure. I fear that too often the patient is sent away with a slight change in his lenses, a procedure that is not justified unless there is a substantial discrepancy between our refraction and the last one, which is seldom the case. Many of these patients show a weak converging power, and I frankly admit that not infrequently I order prism exercises, together with gradually increasing use of the eyes, in addition to a mental stimulus to restore his self confidence. Were I a trained psychologist it would, I believe, be possible to dispense with such placebos to a large extent. I believe that the average run of these cases can be handled by the ophthalmologist. The disabilities founded on fear are much easier to treat than those in which the eyes are the means of escape from an unpleasant environment.

Dr. William T. Davis, Washington, D. C.: In the textbooks are the following groups: (1) hypochondriacal; (2) neurasthenic; (3) copiopia or nervous asthenopia; (4) hyperesthesia and anesthesia retinae, and (5) hysteria. An ocular neurosis is at times very difficult to diagnose; we must not be in error here, or infinite damage may result. These cases must be carefully studied, and eyestrain or ocular disease eliminated. Likewise must we as minutely study the patient's general condition and eliminate any physical cause of the symptoms, such as nasal disease or oral cavity disease. If we now eliminate ocular and physical causes, we have as a residue the neurosis. These cases are difficult to handle and require patience, time, and sympathetic understanding. They are not to be considered from a material standpoint so much as a spiritual one. What is the cause of the neurosis from which these patients suffer? In order to determine this, the full life history, the childhood, occupation, social relations and sex relations should be investigated; an entirely different history than the medical history, which is of material things. To accomplish this, the utmost tact and patience are required. The patients must feel that we are honestly and earnestly endeavoring to help them. Also, the personality and standing of the physician play an immense part; it is not given to every one to succeed in the therapy of this type of malady. After having ascertained the cause, we are then called on to exert our resources to the extreme limit in order to disentangle these patients from their mental maze. The ophthalmologist can successfully treat many of these cases by a careful and painstaking study of them.

Dr. G. C. Savage, Nashville, Tenn.: The time is coming when the general practitioner will refer more patients to the oculist than he has been in the habit of doing in the past, and this will be because of the fact that he has learned that the work done for these patients, by the oculist with his painstaking investigation, helps them to get relief from symptoms for which they have been treated before. Many cases of digestive disturbance have been referred to me by the general practitioners in my city, and I have been able to help effect a cure. The eye is not Pandora's box, but comes about as close to it as any other organ of the body. There are more centers closely connected with the function of seeing than with any other function of the body, and these errors of vision and malattachment of ocular muscles are the cause of more neurotic conditions than anything else under the sun. Whenever a patient is neurotic and is referred to an oculist for investigation, or when a patient comes of his own volition, it is the duty of the oculist to make most thorough investigation, and the investigation is by no means complete when he finds how much hyperopia and astigmatism he has. If one stops there, one stops far short of one's duty. The ocular muscle deserves investigation in every case, and I would feel ashamed of myself if I were to allow a patient to leave my office without having made every investigation possible of the condition of the ocular muscle. There are centers in the brain from which the neuritic power must proceed, but that power is not volitional. The volitional centers give little trouble, but when the involuntary centers are called on to do the corrective work that they are placed in the body to do, trouble results. The eye centers that are capable of disturbing the entire economy of the body are involuntary centers, and are concerned with malattachments or abnormal size of the ocular muscle, causing heterophoric conditions.

Dr. George F. Keiper, Lafayette, Ind.: This paper is a study in abnormal psychology, and we should be very grateful to the authors for having called our attention to these states. However, in order that we may understand the subject of abnormal psychology in all its ramifications, it is absolutely necessary that we should understand normal psychology, and that is not very hard for the oculist to do if he wishes, because we have in our offices the same kind of apparatus that the psychologist uses in his laboratory, and we can avail ourselves of a great deal of information along this line. By knowing the normal conditions of mind operation (cerebral reflexes), we can better understand abnormal conditions, and in that way do our patients a great deal of good. It is wonderfully satisfying when one is using a phorometer, for example, when the patient can tell a variation of one fifth of a degree, to be able to tell the patient that his head is working all right on the inside. The patient appreciates that information, and will talk about it, to one's credit. The same thing

is true of other apparatus we use, such the perimeter and the large screen employed in measuring blind spots and their defects. Would that every oculist were a trained psychologist, as Dr. Derby has just now wished; and it is possible for us in our study of our patients to acquire this information. But there is a lot of psychology floating around that is wrong, and we should be very careful as to whom we follow along this line. Fortunately, the laboratories of our universities will give us all the information we need, and we can peruse textbooks like those put out by Professor Pillsbury of the University of Michigan, or by President Angell of Yale, or Professor Seashore of the University of Iowa, and by taking up books like these and reading and working with them in the investigation of our patients, we shall learn a great deal and come nearer to a condition of mind which is wonderfully helpful and which will enable us immediately to distinguish abnormal conditions, and perhaps in a very short space of time set our patients right, if we find we are not getting along well with the treatment heretofore prescribed, which is not working as we should like. I would urge every ophthalmologist to enter on a study of this interesting subject.

DR. LAWRENCE K. LUNT, Stockbridge, Mass.: It is, indeed, gratifying to hear all these doctors accept full responsibility. There is no question that it is the responsibility of every specialist to know something about the individual behind the specialty. The background of every specialty is the man himself, and, just as a broad knowledge of general biology makes us more capable in any of the specific biologic sciences, so a broad knowledge of human beings makes us more efficient and more effective in whatever specialty we may be practicing. Of course Dr. Hill is right—many patients do not want to go into their emotional disturbances with the ophthalmologist, and often not with the neurologist or general practitioner or any one. Sometimes perhaps we have the experience of the physician who, after an exhaustive investigation of a Scotch patient, told him: "Well, sir, you will have to give up the use of alcohol, you will have to stop smoking, you must eat sparingly, and you must not worry." The Scotchman got up and moved toward the door, when the doctor said, with some agitation, "My man, I expect to be paid for my advice." The Scotchman continued his course toward the door, and when he got there turned and said, "Aye; but I'm no takin' it." But that does not relieve us of the responsibility in the next case of trying to see whether we cannot be of further assistance in bringing about a better understanding. Dr. Keiper's word of warning in regard to the wrong psychology that is written is very well timed. There is probably more trash written with regard to the mind than with regard to any other department of man. Psychanalysis has given a tremendous boost to and a rather salacious interest in the abnormal vagaries of the human mind, and has unfortunately given the impression that all psychiatrists are psychanalysts. That is not so, and there are a great many of us who do not believe in so-called psychanalysis. One should beware of psychanalytic books, reading them with one eye shut. Dr. Savage's exhortation to make a painstaking examination is also very timely. The casual examination that is apt to be made by all of us when we are in a hurry is apt to do more harm than good. A painstaking examination, going carefully over all of the symptoms and trying to come to a common sense evaluation with a friendly and patient explanation, will prevent the formation of many neurotic habits.

Mendelian Inheritance.—The essential feature of Mendel's law is that characteristics behave as units in inheritance and are capable of being combined in varied relations and assorted in definite numerical ratios. Mendelizing characters go in pairs, and on account of the way in which these characters are distributed, Mendel was led to assume that the germ cells are pure for one or the other of such pairs. . . . Various pairs of characters may be independently assorted, producing mendelian ratios of various kinds according to the number of independent characters dealth with.—Holmes, S. J.: Studies in Evolution and Eugenics, New York, Harcourt, Bruce & Howe, 1923.

CALCIUM AND PARATHYROID GLANDS IN RELATION TO HYPERESTHETIC RHINITIS

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There recently have been advocated some new conceptions with regard to the etiology and treatment of so-called vasomotor rhinitis. Much emphasis has been placed on the rôle of the parathyroid glands in this disease as well as on the disturbances in calcium metabolism which are said to take place concurrently. A brief summary of the current ideas concerning normal function of the parathyroid glands, their rôle in disease and their therapeutic value is perhaps timely. Interesting also are the modern theories concerning calcium metabolism, its disorders, and the use of calcium clinically.

The parathyroid glands are four in number, lying near or in the substance of the thyroid glands. Histologically and in function, they are quite independent of the latter. Accessory glands occur and may account for discrepancies in the results following parathyroidectomy. Structurally, the parathyroids consist of interstitial tissue containing two sorts of cells: the chief or principal ones, which are small and somewhat granular with deeply staining nuclei; and the oxyphil cells containing granules which stain with eosin. The parathyroids are essential to life.

Chief in interest at least among metabolic disturbances caused by parathyroidectomy is that concerning calcium. Observers are not yet agreed regarding these changes; whereas MacCallum and Voegtlin,[1] in experiments on dogs, report a decreased amount of calcium in the brain and blood, others do not confirm these findings and some even report contrary results.

There is thought to be an equilibrium between the calcium in the body tissues and that in the blood. The amounts of calcium in blood serum and blood plasma, while not exactly the same, approximate each other. In normal plasma the calcium is said to vary from 9 to 11 mg. per hundred cubic centimeters. Of this, roughly speaking, about 60 per cent. is active, or "ionized," and can be precipitated by its chemical equivalent of ammonium oxalate. The remaining 40 per cent. requires about three times its oxalate equivalent and is considered to be bound to a lipoid complex.[2]

In some pathologic instances, the easily precipitable calcium may be decreased, whereas the total amount is not always diminished. It has been assumed that the parathyroid glands govern calcium metabolism, and that whenever a calcium deficiency is present in disease, these glands are necessarily involved. The evidence on this point is by no means adequate. The list of diseases in which a calcium deficiency has been reported is impressive, ranging as it does from nephritis, uremia, eclampsia, idiopathic tetany, paralysis agitans, epilepsy, spasmophilias, carcinoma and varicose ulcers to vasomotor rhinitis.

In experimental tetany, which is certainly due to loss of parathyroid function, not only is there doubt regarding the changes in calcium metabolism, but it is questionable whether a deficiency in calcium, even if

1. Cited by Paton, D. N.: Regulators of Metabolism, London, 1913, p. 130.
2. Vines, H. W. C.: The Parathyroid Glands in Relation to Disease, London, 1934, p. 25.

present, is responsible for the symptoms; and this in face of the fact that calcium therapy allays the symptoms of tetany. The clotting time of the blood, which is dependent in part on the presence of calcium, is not affected by parathyroidectomy.

There is evidence to the effect that the symptoms caused by removal of the parathyroids may be partly due to a toxemia, perhaps of intestinal origin.[3] A detoxicating function has long been ascribed to the parathyroids. Guanidin, which is toxic except in minute amounts, has been isolated in quantity above the normal from the blood of parathyroidectomized animals. It produces symptoms similar to those following removal of the parathyroids.[4] But how the loss of these glands is responsible for the appearance of guanidin is not known. It is thought by some to arise in the blood from the breaking down of protein molecules (endogenous origin), and by others as being caused by absorption from the intestines when a meat diet is used (exogenous origin).[5]

As previously stated, numerous diseases are attributed to parathyroid gland involvement: (1) on the basis of their resemblance to tetany parathyreopriva, as, for instance, idiopathic tetany and spasmophilia; (2) because these diseases show changes in calcium metabolism, or (3) because they respond to treatment with calcium, and parathyroid gland substance, given singly or combined.

The most characteristic of these is the idiopathic tetany of children. This is attributed unhesitatingly by most authors to impaired function of the parathyroid glands, and there is evidence to support this view. Even here, however, the findings are not clear cut and beyond question. In postmortem examination, it is true Erdheim and others have demonstrated hemorrhages in the parathyroid glands of children dying from tetany.[5] These hemorrhages are, however, not confined to the parathyroids alone,[6] and Sharpey Schafer states that there is usually nothing abnormal to be detected in them.

There is also a difference of opinion in that some authors report a calcium deficiency in the blood of children suffering from idiopathic tetany, while others have found no deviation from the normal.[7]

In practically all of the other conditions, the parathyroids are assumed to be at fault because of a lowered calcium content in the blood, or because of improvement following parathyroid therapy. In the first group belong such illnesses as spasmophilia, varicose ulcers, and ulcers of the stomach and intestines.[8] Vines and Grove report a decrease in the amount of calcium in malignant neoplasms, and state that parathyroid therapy brings a return to the normal content. They did not observe an inhibitory effect on the growth of the tumor, but noted that pain and vomiting were diminished.

Goldzieher [9] asserted that the use of calcium was to some extent inhibitory to the growth of carcinoma. It is apparent that results such as these must be repeatedly confirmed before any practical conclusions can be drawn. Even if calcium reduction is present in diseases of man, it is not by any means always explicable on the basis of a parathyroid deficiency. Carlson is of the opinion that we have new evidence pointing toward some relation between calcium and proper intestinal function.

Even less satisfactory is the evidence in those illnesses wherein the guilt of the parathyroid glands is only partially assumed because of the improvement following parathyroid therapy. Here again conflicting claims present themselves. Ott states that, in addition to other findings, the intravenous use of parathyroid substance first raises and then lowers the blood pressure. It is held by others that experimentally the intravenous use of parathyroid substance alleviates the symptoms due to the ablation of the glands. Disregarding the danger of injecting into the blood stream of man, for instance, a foreign animal protein, there are other explanations for favorable results besides the one of specific action. So far as is known, only two organs contain pressor substances. These are, of course, the pituitary and suprarenal. All other tissue extracts injected intravenously lower blood pressure (Carlson), and it may be due to this action that favorable results are reported. Bleeding, which reduces blood pressure, has long been known to lessen the symptoms of experimental tetany. It is worth repeating that bleeding lowers the calcium content of the blood, an interesting commentary on the theory that calcium deficiency is responsible for the effects of parathyroidectomy Schafer [10] has been unable to confirm Ott's findings; he observed no specific effect of the boiled and filtered extract of the glands, and states that there is general agreement that parathyroid secretion injected directly into the blood stream has no acute effect. He mentions the interesting findings of Cameron and Carmichael, who observed tetany in several of their animals after feeding large amounts of parathyroid gland. Several workers have reported that they alleviated the symptoms of experimental tetany by the subcutaneous use of extracts of the gland. In the human being, at any rate, no conclusions as to the value of parathyroid therapy can be drawn. The use of the gland intravenously is at present dangerous, there is no evidence as to its effect when administered subcutaneously, and there is no proof that, given orally, it is of any benefit whatever.

As to the value of calcium in disturbances characterized by hyperirritability, the statement of Sollmann is authoritative and has perhaps the support of most physiologists and pharmacologists. He says: "The action of calcium is directly depressant to all tissue and functions; when injected intravenously it paralyzes the central nervous system, lowers the blood pressure, arrests diuresis and peristalsis." [5]

Carlson and Jacobson, Beebe and Berkeley, and others have stated on the basis of experimental work that, in their opinion, in parathyroid tetany (experimental) the action of calcium is solely depressant and does not depend on the restoration to normal of a deficient calcium content in the tissue. In those human ailments in which parathyroid malfunction is assumed, chiefly because there is present a calcium deficiency in the blood, the action of this chemical is probably no different. The remaining members of the chemical group to which calcium belongs act similarly as depressants. Strontium is just as efficient in experimental tetany, barium and magnesium are somewhat less so. Carlson [11] writes: "To the extent that the calcium remains, that is, penetrates the mucous membrane, we have every reason to believe that it depresses tempo-

3. Vines: The Parathyroid Glands in Relation to Disease, p. 16.
4. Schafer, E. S.: The Endocrine Organs, London, 1924, p. 83.
5. Schafer: The Endocrine Organs, p. 82.
6. Carlson and Jacobson: Am. J. Physiol. 28: 133, 1911. Kosh, W. B.: J. Exper. & Clin. Med., 1917, quoted by Schafer.
7. Bergstrand, H.: Nederl. Tijdschr. v. Geneesk., 1919, quoted by Schafer, p. 8.
8. Vines: The Parathyroid Glands in Relation to Disease, pp. 48, 49.
9. Goldzieher: Verhandl. deutsch. path. Gesellsch. 16: 283, 1912, quoted by Vines, p. 53.
10. Schafer: The Endocrine Organs, p. 85.
11. Carlson, A. J.: Personal communication to the author.

rarily such nerves and nerve endings as it reaches. If used in hypertonic solution, it will in addition temporarily dehydrate the membrane."

From the clinical standpoint, we may well ask whether the recent interest in hyperesthetic rhinitis is due to its greater prevalence than formerly, or whether it is because so many therapeutic measures, largely from an empiric standpoint, have been applied to the relief of this very annoying and distressing condition. We believe that most of us engaged in rhinologic work have been impressed with the fact that during the last few years we have seen many more patients with symptoms peculiar to the so-called hyperesthetic rhinitis or vasomotor rhinitis than was formerly our experience. It is possible that the very widespread use of cosmetics in recent years has been partly responsible for this increased frequency, or perhaps we have learned to recognize the characteristics of this disease more readily.

So far as the pathology is concerned, we usually see in this class of patients a pale, edematous, boggy, water logged nasal mucous membrane. Often the middle turbinates appear as thought fluid is about to exude from them. As a rule, the patient gives a history of very frequent so-called "head colds" (sometimes as often as two or three times a week), accompanied by persistent sneezing and the outpouring of a large amount of thin, serous secretion.

The exact causation of this condition has as yet not been definitely or completely determined. There are those who maintain that this disturbance is merely an anaphylaxis due to a protein sensitization of one form or another, either food, emanations from animals, such as dander from horses or dogs, food or bacterial products. We are, however, seeing many cases in which no protein sensitization can be demonstrated. Another cause is irritation from cosmetics and the inhalation of dust and chemical fumes in laboratories. Some people are sensitive particularly to chicken and duck feathers, which are commonly used in pillows. It has been held by some that a deficiency in vitamin A was a causative factor in hyperesthetic rhinitis. Although we have at times tested very carefully considerable series of patients, by giving large quantities of crude cod liver oil, which is so rich in this fat soluble vitamin A, we were in no case able to see any beneficial effect whatever. Latterly, much emphasis has been placed on the deficiency of the calcium content of the blood as the etiologic factor in this condition. Hay-fever has been treated for some years by the use of calcium by mouth. We have used calcium chlorid solution not only locally in the nose, but have employed it or a solution of calcium chlorid urea (afenil) intravenously. By mouth we have often given calcium lactate in 5 grain (0.3 gm.) doses together with from one-quarter to one-half grain (0.016 to 0.03 gm.) of thyroid three or four times a day. Trying all these measures, we have at times had excellent results and at other times very poor ones. Thyroid, we presume, has been used to restore the lowered metabolism at one time thought to be the cause of hyperesthetic rhinitis. We know, however, that as a rule a diminished metabolism is not present in this condition.

The calcium preparations, however, seemed to give the greatest relief and for the longest period of time. In one case for almost twelve months, the patient was entirely free from all symptoms, merely from the use of calcium lactate and dried thyroid by mouth. Carlson emphazes the fact that when used locally in the nose, calcium solution probably acts as a depressant to the sensory nervous mechanism. When used by mouth, it may, no doubt, have a similar depressant effect on the sensory nerve endings of the gastro-intestinal mucosa. It has not been shown that if absorption does occur from this mucosa, the calcium in the blood stream will then have a selective action on the nasal mucosa. When the calcium solution is injected intravenously, can we say that it has any other than a generalized depressant effect?

Whenever sensitization was suspected, the tests for proteins and bacteria were made. Desensitization was then carried out with considerable success in some instances. Some cases have improved considerably with the elimination of face powder and other cosmetics, and the avoidance of certain food substances; with local treatment of the nose by means of trichloracetic acid in the middle meatus; with the application of dilute formaldehyd solution to the anterior nasal nerve or to Meckel's ganglion. Some individuals, however, were uninfluenced by any or all of these measures.

It has been held by some [12] that the improvement with the use of calcium salts is due to correction of the calcium deficiency of the blood content, and that when this again is reduced, many persons have a recurrence of the hyperesthetic rhinitis. To fix the "ionized" calcium content, in the effort to give prolonged relief from the calcium deficiency, they use and advocate exposure of the body to ultraviolet rays by means of the quartz lamp.

There are a few questions to be answered before we can say that any or all of this therapy rests on a rational basis, or whether it is merely empiric. Of course, if patients are improved by an empiric therapy, that is all they desire. Physicians also are usually satisfied with such therapy, provided no better means can be employed, but it seems to us that we should try in all cases of medication, whether in this particular condition or in any other, to learn, if possible, the rationale of any procedure.

First question: Is a calcium deficiency usually or always the cause of hyperesthetic rhinitis?

Second question: What is the effect of calcium on the mucosa or the nervous mechanism of the nose?

1. With reference to the blood calcium content: We may say that the normal is placed by most authorities at from 9 to 11 mg. per hundred cubic centimeters of blood. We have had quite a number of estimations made by several laboratories and have found an average of about 10.9 mg. In none of these cases was there a deficiency of the blood calcium content, even though all the cases examined presented a typical hyperesthetic rhinitis. While it has been stated that only some of the cases of hay-fever show a calcium deficiency, it has been definitely asserted that there is invariably a calcium deficiency in the true hyperesthetic rhinitis.[12]

In the latter condition, local applications as mentioned above, the avoidance of certain foods, cosmetics, the use of calcium lactate and thyroid gave considerable, and at times, great relief. This was in some cases only transient; in others it persisted a rather long time; i. e., from four to twelve months. Intravenous injections of calcium chlorid or of a solution of calcium chlorid urea have given us more rapid benefit, but we cannot as yet state how lasting it will be.

Let us draw attention to the fallacy of mixed therapy, and the danger of drawing conclusions therefrom. We admit, in common with many others, having administered calcium lactate and thyroid at one and the same

12. Novak, F. J., Jr., and Hollender, A. R.: Influence of Ultraviolet Irradiation on Calcium Content of Blood Serum, J. A. M. A. 81:2003 (Dec. 15) 1923.

time. Those who have used the ultraviolet radiation state that they usually administer the foregoing drugs at the same time. In order to determine definitely the value or otherwise of any one therapeutic agent, we believe that one measure or drug alone should be used under proper control. It is possible only after observation of a long series of cases to decide whether the one particular medicament or therapeutic agent is or is not of value. It is true that some men at present are using the ultraviolet rays alone without any other treatment of the patient. We trust that from this line of investigation some definite result may be had. Our own clinical results are not of much value since we also committed the error of using both local and general measures at the same time, and therefore do not know to which one to ascribe the good results that we have had in some cases.

2. With reference to the effect of calcium on the nasal mucosa or nervous mechanism of the nose: As previously stated in this paper, when used locally in hypertonic solution, calcium salts probably abstract fluid from the mucosa and depress the sensory nerve endings, and it is this action that perhaps gives the temporary relief so often noted.

While ultraviolet ray applications have given good results in some skin conditions and in rickets, we are not in a position to pass judgment on their effects on the calcium content of the blood, since we have not as yet tried it, nor have cases, to our knowledge, been observed for a very long period of time thereafter. Irrespective of any therapeutic effect to be derived from ultraviolet ray treatment, we believe it is still too early to answer the question definitely. Is blood calcium deficiency responsible for hyperesthetic rhinitis? Judging from the laboratory reports we have had we believe few cases, if any, are caused by this factor alone. Dr. Thomas L. Dagg and Dr. J. J. Moore [13] state that their laboratory experience inclines them to the belief that the normal calcium content of the blood is about 9 to 11 mg. per hundred cubic centimeters of blood. In no case of typical hyperesthetic rhinitis have they found any calcium content reading below 9 mg. In other words, all the findings were within the normal range. Carlson expressed the view that the methods of determining calcium content are not very reliable. Therefore a slight variation is probably of no great significance. It has seemed quite surprising to us that in those cases which showed from a clinical standpoint all the classical findings and symptoms of hyperesthetic rhinitis, we have had no reading that would indicate a real reduction in calcium content. It is also not clear to us that fixation of "ionized" calcium in the blood has been absolutely proved; but those who use the quartz lamp base their procedure on the supposition that this fixes the ionized calcium in the blood. It has been reported that while beneficial results are had during the ingestion of calcium salts, the improvement usually disappears shortly after the therapeutic agent is discontinued. On the basis that the ultraviolet light fixes the ionized calcium in the blood, it is said to give beneficial results after stopping the use of drugs. But has it been proved that there is fixation of ionized calcium in the blood?

CONCLUSIONS

1. It is doubtful whether the blood calcium content is the only one and essential factor in the causation of hyperesthetic rhinitis, since none of the cases in our series of clear cut instances showed a definite deficiency, and the quoted statements of others point to similar findings.

2. Ultraviolet ray radiation may be beneficial; further trials are needed to prove this point conclusively.

3. Calcium intravenously probably acts as a sedative, and this gives temporary relief in many cases; its action when given by mouth is undetermined.

4. There is little evidence that in man, at least, parathyroid feeding is of any value.

5. Thyroid is probably of value only in cretinism and acquired thyroid deficiency, surgical or otherwise. Taken in large doses, it has a tendency to raise the metabolic rate. This is not a desirable feature, especially with reference to hyperesthetic rhinitis, since it has been definitely shown that a lowered metabolism is not usually present in this condition. We doubt, therefore, whether it has any value in hyperesthetic rhinitis even when used as an adjuvant to calcium or parathyroid. We wish to emphasize once more the desirability of using only one medicament or therapeutic measure at a time in order to arrive at a definite conclusion regarding the value of calcium, parathyroid, thyroid or ultraviolet radiation in the treatment of hyperesthetic rhinitis.

29 East Madison Street.

13. Dagg, T. L., and Moore, J. J.: Personal communication to the authors.

THE PROGNOSTIC VALUE OF GASTRIC ACIDITY IN CASES OF RESECTABLE CARCINOMA *

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The diagnostic value of gastric analysis, and particularly of gastric acidity, has received much comment in medical literature, and the possibility of obtaining a correct idea of the characteristics of the whole gastric content, by means of a single tubing or fractional aspirations and analysis, has been questioned. Nevertheless, a practical working base has been established. Gastric acidity aids in determining the degree of activity of peptic ulcer, and the need for radical or conservative intervention. Experience has taught us that an ulcer cannot be active if there is frank anacidity, and surgical intervention seems most advisable when the gastric acidity is high.

Time and further investigation may compel us to change our ideas with regard to gastric analysis. Formerly, anacidity was considered essential to the diagnosis of carcinoma of the stomach. The literature gives varying data as to the frequency with which free hydrochloric acid is found in such cases. Friedenwald and Bryan [1] recently reviewed 100 cases and corroborated the report on this subject recently published from the Mayo Clinic.[2] From these two reviews it is safe to conclude that free hydrochloric acid is present, in amounts varying from low to abnormally high values, in practically 50 per cent. of cases of gastric carcinoma.

The acidity was not influenced by the location of the carcinoma in a series of eighty cases in the Mayo Clinic, but was influenced by the duration of malignancy. The more advanced the carcinoma, the less often was it possible to find free hydrochloric acid. Therefore, con-

* From the Section on Medicine, Mayo Clinic.

1. Friedenwald, J., and Bryan, W. J.: Presence of Free Hydrochloric Acid in Gastric Contents in Carcinoma of Stomach, J. A. M. A. 83: 265-266 (July 26) 1924.

2. Hartman, H. R.: The Prevalence of Free Hydrochloric Acid in Cases of Carcinoma of the Stomach, Am. J. M. Sc. 168: 186-189 (Feb. 22) 1922.

fidence cannot be placed in the presence of free hydrochloric acid to rule against the diagnosis of gastric carcinoma, but the prognostic evidence which acidity might furnish, other factors being more or less equal, is worthy of consideration. A brief statistical review of cases of resectable carcinoma of the stomach is here presented, as it affords a possible clue to the prognosis in such cases. The cases were taken in sequence, and without regard to the degree of malignancy.

Forty-one patients, who had had free hydrochloric acid, as determined by the fractional aspiration method, and on whom resection of the stomach had been performed for microscopically proved carcinoma, were traced five years after operation. Seventy-eight per cent. of the patients were dead; the average postoperative life was 12.6 months. Twenty-two per cent. were alive five years after operation.

A group of thirty-nine patients with anacidity were traced five years after resection of the stomach, for lesions proved microscopically to be carcinomas. Fifty-six per cent. were dead; the average postoperative life was 15.4 months. Forty-four per cent. were alive five years after operation.

It is not, of course, advisable to draw final conclusions from eighty cases, but these data apparently show that a patient with a resectable carcinoma and anacidity has a 44 per cent. chance of at least five years of life, postoperatively, and twice the chance of a similar patient with free hydrochloric acid.

STUDIES ON THE EFFECT OF ROENTGEN RAYS ON GLANDULAR ACTIVITY

IV. EFFECT OF EXPOSURE OF ABDOMINAL AND THORACIC AREAS TO ROENTGEN RAYS ON GASTRIC SECRETION; NOTE ON ROENTGEN CACHEXIA *

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In previous articles on the subject of the effect of roentgen rays on glandular activity, we have presented evidence showing that the submixillary and gastric glands are not stimulated by small doses of roentgen rays, but that their secretion can be depressed with relatively large doses.[1] German authors have for years been quoting what they call the Arndt-Schulz law, which states that small doses of an active agent stimulate, moderate doses depress or paralyze, and large doses destroy or kill, and have been assuming and claiming that this law applies to the action of the roentgen rays.

On the basis of biologic principles and facts we could not accept this law, at least as applying to the action of roentgen rays on glandular activity [2] and our view has been supported by our experimental observations up to date. Our results on this point have also been corroborated recently by the observations of Holzknecht [3] and by Frik and Krüger.[4]

In our former works on the gastric and submaxillary glands, an attempt was made to direct the roentgen rays so that only a small amount of other than the glandular tissue under study was exposed to the direct action of radiation. This was done in order to rule out any indirect effect that might result from the action of roentgen rays on other tissues, and made it possible for us to conclude that the observed results were due to the direct action of the roentgen rays on the gland cells. However, it is obviously important to know the effect on gastric secretion of irradiation of other tissues than, for example, the stomach itself. So in this work we are primarily interested in the effect on gastric secretion of the exposure of the abdominal and thoracic areas to roentgen rays.

Effect on Gastric Secretion of a Human Erythema Dose of Roentgen Rays (Short Wave Length) Over the Intestinal Area

Procedure		Time, O'Clock	Amount Free Acid C.c.	Total Acid	Comment
Pawlow Pouch Dog					
Gastric Secretion					
Before roentgen ray:					
Continuous secretion.		1-2	1.7	10	22	
Meal	First hour.....	2-3	11.4	35	69	250 gm. meat
	Second hour....	3-4	4.5	42	97	
	Third hour.....	4-5	5.7	37	97	
Two days after:						
Continuous secretion.		8- 9	9.0	82	110	
Meal	First hour.....	9-10	14.0	92	117	Ate one third of meal
	Second hour....	10-11	19.5	117	132	
	Third hour.....	11-12	17.0	110	127	Bloody stools
	Fourth hour....	12- 1	21.5	107	122	Diarrhea
Seven days after:						
Continuous secretion.		8- 9	0.8	0	12	
Meal	First hour.....	9-10	6.5	65	75	Appetite excellent
	Second hour....	10-11	10.8	95	105	
	Third hour.....	11-12	6.2	89	99	

Third day, complete anorexia, marked depression.

METHODS [5]

Pawlow pouch dogs have been used, and the detailed methods of experimentation followed have been outlined in a previous paper.[6] In two animals, 1 mg. of histamin was injected before the roentgen-ray exposure, and again during the period of anorexia, to ascertain whether the gastric secretory mechanism was fundamentally involved. Necropsy was performed on all except one of the animals that have died to date, and histologic examination of the intestine was made.

The roentgen-ray dosage is given in the protocols of the experiments, and the reason for selecting the three different doses is referred to in the summary of our results. The acidity of the gastric secretion is expressed in clinical units.

RESULTS

The left thoracic wall of two Pawlow pouch dogs was exposed to the following dose of roentgen rays: 110 kilovolt minutes, 5 ma., 30 cm. focal skin distance, 1 mm. aluminum filter, 6 cm. diameter portal for thirty-seven minutes. On the thirteenth and fourteenth days, the skin peeled and a shallow ulcer appeared, which persisted without healing for about two months. This treatment did not cause the animals to vomit, produced no symptoms whatever, and gastric secretion was not altered, observations being made for two months after the exposure.

* From the Hull Physiological Laboratory, the University of Chicago.
* Preliminary report made at the Radiological Society of North America, Rochester, Minn., December, 1923.
* Read before the meeting on radiology in the Section on Miscellaneous Topics at the Seventy-Fifth Annual Session of the American Medical Association, Chicago, June, 1924.

1. Ivy, A. C.; Orndoff, B. H.; Jacoby, A., and Whitlow, J. E.: J. Radiol. 4:189 (June) 1923; Radiology 1:39, 1923.
2. Ivy, Orndoff, Jacoby and Whitlow (Footnote 1, first reference).
3. Holzknecht, G.: München med. Wchnschr. 70:761 (June 15) 1923.
4. Frik and Krüger: Ztschr. f. klin. Med., p. 264, 1923.
5. The anatomic studies have been made by Dr. A. B. Dawson, Department of Anatomy, Loyola University School of Medicine.
6. Ivy, Orndoff, Jacoby and Whitlow (Footnote 1, second reference).

Very different and definite effects resulted, however, when the intestinal area was exposed to roentgen rays. These effects are outlined in the following protocols:

GROUP 1. PROTOCOLS ON TWO DOGS RECEIVING APPROXIMATELY TWO AND ONE-HALF HUMAN ERYTHEMA DOSES OF ROENTGEN RAYS OF MEDIUM WAVE LENGTH

EXPERIMENT 1 (Dog 1).—The average secretion from the pouch for four hours after a test meal was 20 c.c., the free acidity 80 units, total, 100. The dog was very vigorous and lively.

The roentgen-ray dose given was: 110 kilovolt minutes, 5 ma., 30 cm. focal skin distance, 6 cm. diameter portal, 1 mm. aluminum filter for thirty-seven minutes, delivered over the right lower abdomen. The animal vomited a meal that was given after the treatment.

On the first and second days after the roentgen-ray treatment the animal secreted from the pouch for four hours after a test meal 25 c.c. of gastric juice; free acidity, 70; total 90. He ingested only a part of the test meal, then vomited it, and reingested it slowly.

The fourth day, a small amount of meat was ingested without appetite, and the dog secreted 6 c.c. in four hours, with no free acid.

From the fifth to the tenth day the dog had a diarrhea, but did not vomit. Anorexia and achylia were present.

The fourteenth day, epilation and vesiculation of the skin appeared, measuring 6 cm. in diameter. The animal ate with subnormal appetite, and secreted 8 c.c. of gastric juice in four hours after a meal, free acidity, 60; total, 70.

The seventeenth day, the appetite was normal. The dog secreted 18 c.c. of gastric juice in four hours after a meal; free acidity, 70; total, 85. The emaciation was marked at this time.

The twenty-second day, a complete blood count was normal. Free acid was present in the continous gastric secretion, but the animal would not eat and was very weak.

The twenty-third day, death occurred. A necropsy immediately after death revealed two ulcerations of the duodenal mucosa and early gangrene of about 1 inch of the jejunal mucosa. The intestine in the area of the changes in the mucosa was markedly contracted. The mesenteric lymph glands were large and soft in consistency.

EXPERIMENT 2 (Dog 2).—The average secretion from the pouch for four hours after a test meal was 11 c.c.; free acidity, 60; total 90. The dog was very vigorous and lively.

The roentgen-ray dose given was: thirty minutes, 5 ma., 110 kilovolt minutes, 30 cm. focal skin distance, 6 cm. diameter portal, 1 mm. aluminum filter, over right lower abdomen. The animal vomited a meal that was given after the treatment.

The second day after the roentgen-ray exposure, no secretion was formed. The dog vomited, but not as much as Dog 1. Anorexia and achylia were present for five days after the roentgen-ray exposure.

The twelfth day, epilation and vesiculation occurred. This was a similar skin reaction to that which occurred in Dog 1.

The thirteenth day, the animal secreted 7 c.c. of gastric juice in four hours after a test meal; free acidity, 40; total, 60. The appetite was not normal.

The seventeenth day, the animal secreted 10 c.c. of gastric juice in four hours after a meal; free acidity, 75; total, 95. The appetite was good. Emaciation was present.

The twentieth day, the cachexia was very evident in spite of the secretion of normal gastric juice and the normal appetite.

The twenty-third day, the appetite was decreased, about 50 gm. of meat and 200 c.c. of milk being ingested daily.

The forty-sixth day, the cachexia was extreme; the animal ate 50 gm. of meat and drank 100 c.c. of milk. The gastric secretion in four hours after the meal was 8.5 c.c.; free acidity, 70; total 85. The blood count was normal, except for a leukocytosis of 30,000.

The fiftieth day, death occurred. The necropsy, immediately after death, revealed: a small amount of blood stained fluid in the intestinal lumen; no palpable mesenteric lymph glands; the spleen very atrophic and hard; intestinal ulcers (one in the duodenum, 2 inches from the pylorus, two in the jejunum, one in the ileum, and one in the cecum near the ileocecal valve).

GROUP 2.—PROTOCOLS ON DOGS RECEIVING APPROXIMATELY ONE HUMAN ERYTHEMA DOSE OF ROENTGEN RAYS OF SHORT WAVE LENGTH

EXPERIMENT 3 (Dog 3).—The average secretion from the pouch for four hours after a test meal was 25 c.c.; free acidity, 50; total, 75. The dog was very vigorous and lively.

The roentgen-ray dose given was: one hundred and twenty minutes, 5 ma., 200 kilovolt minutes, 50 cm. focal skin distance, 11 by 21 cm. portal, 0.75 mm. copper and 1 mm. aluminum filter, over the entire abdomen from the right side. The animal vomited within a half hour after the exposure and intermittently for the next two hours.

The first day after the roentgen-ray exposure, the animal ate without appetite, but in spite of this secreted 55 c.c. of gastric juice in four hours, free acidity, 95; total, 115.

The third day, the animal ingested one third of the test meal and secreted 72 c.c.; free acidity, 105; total, 125. Diarrhea with blood was present.

The fourth day, the animal would not eat, but formed a normal continuous secretion with free acidity.

The fifth day, the appetite returned to normal, and the secretion of the pouch returned to normal.

The ninth day, the dog died from obstruction, due to intussusception caused by brisk catharsis. He was in good health prior to death, the average gastric secretion being slightly above normal, the quantity 30 c.c.; free acidity, 57; total, 70.

EXPERIMENT 4 (Dog 4).—The average secretion from the pouch for four hours after the test meal was 29 c.c.; free acidity, 100; total, 120. This animal was well nourished, but not as fleshy or as lively as Dog 3.

The roentgen-ray dosage given was the same as for Dog 3. The animal vomited within a half hour after the exposure, and intermittently for the next two hours.

The first day after the roentgen-ray exposure, the animal did not eat all of the test meal, but secreted 51 c.c. of gastric juice in four hours; free acidity, 95; total, 105.

The third and fourth days, there was complete anorexia, but a normal continuous gastric secretion with free acid was formed.

The fifth day, complete achylia and anorexia were present, which continued to the time of death on the seventh day. The necropsy, immediately after death, revealed: all organs grossly negative except the stomach and the intestines. There were a few petechial hemorrhages in the mucosa of the stomach, and one loop of upper ileum, 6 inches long, was contracted and discolored, its mucosa being hyperemic and varying in areas from bright red to purple.

EXPERIMENT 5 (Dog 5).—The average secretion of the pouch for four hours after the test meal was 21 c.c.; free acidity, 75; total, 95. This animal was well nourished, but not as lively as Dog 3.

The roentgen-ray dosage given was the same as for Dog 3. The animal vomited within a half hour after exposure and intermittently for four days.

The first day after the roentgen-ray exposure, the animal ingested all of the test meal, and secreted 39 c.c. of gastric juice; free acidity, 100; total, 115.

The second day, only one half of the test meal was ingested, but it was vomited two hours later. In four hours, the secretion amounted to 14 c.c.; free acidity, 77; total, 88.

The third day, there was complete anorexia with a normal continuous secretion, with free acid.

The fourth day, there was complete anorexia, achylia and vomiting.

The fifth day, the animal ingested one half of the test meal, and secreted 15 c.c. of juice; free acidity, 85; total, 112.

From the eighth to the thirteenth day, there was partial anorexia associated with achylia, except on two days when a small amount of free acid appeared in the continuous secretion.

The fourteenth day, death occurred. Necropsy immediately after death, revealed that an 8 inch loop of the upper intestines was contracted and its mucosa was definitely conjested, being bluish red. No other changes were observed.

EXPERIMENT 6 (Dog 6).—The average secretion of the pouch for four hours after the test meal was 18 c.c.; free acidity, 70; total, 90. This animal was well nourished and very lively.

The roentgen-ray dosage given was the same as for Dog 3. The animal did not vomit at any time after the treatment.

The first day after the exposure, the appetite was good, and the gastric secretion formed was 32 c.c.; free acidity, 90; total, 105.

The second day, the dog did not eat all of the test meal, but secreted 11 c.c.; free acidity, 70; total, 80.

The third day, there was complete anorexia, but the continuous secretion showed free acid.

From the fourth to the sixth day, the animal ingested all of the meal. The average gastric secretion was 9 c.c.; free acidity, 40; total, 55.

From the seventh to the twentieth day, the animal was normal, objectively, in every respect.

From the twentieth to the twenty-sixth day, the animal lost weight rapidly. On the twentieth day, the animal suffered from a hemorrhage.

The twenty-seventh day, the dog died. No necropsy was performed. It is impossible to state whether the animal died from the hemorrhage or as a result of the roentgen-ray exposure.

EXPERIMENT 7 (Dog 7).—The average secretion of the pouch for four hours after the test meal was 37 c.c.; free acidity, 90; total, 105. This animal was thin and not lively, but had an excellent appetite.

The roentgen-ray dosage given was the same as for Dog 3. The animal did not vomit.

The first day after the exposure, the appetite was good, and the secretion formed was 49 c.c.; free acidity, 95; total, 110.

The second day, the dog did not eat all of the test meal, but secreted 23 c.c.; free acidity, 75; total, 95.

From the third to the sixth day, there was complete anorexia, but the dog secreted a normal continuous secretion containing free acid.

The seventh day, death occurred. Necropsy, immediately after death, revealed that the intestine was "loaded" with worms. There were six hyperemic areas in the jejunum and the ileum which resembled the condition described in Dog 5.

EXPERIMENT 8 (Dog 8).—The average secretion of the pouch for four hours after the test meal was 17 c.c.; free acidity, 55; total, 75. The animal would not eat all of the test meal, was thin and not lively.

The roentgen-ray dosage given was the same as for Dog 3. The dog vomited after treatment.

The first day after the exposure, the appetite was the same as before the roentgen-ray exposure, and the secretion found was 18 c.c.; free acidity, 80; total, 100.

From the second to the fifth day, the animal would not eat, but showed free acid in the continuous secretion. During this period, the gastric secretory response of 1 mg. of histamin was reduced to 50 per cent.

The sixth day, death occurred. Necropsy, immediately after death, revealed that there was definite congestion of the entire intestinal mucosa, similar to that which is present in enteritis in dogs. An ulcer was present in the stomach near the incision made at the Pawlow pouch operation.

EXPERIMENT 9 (Dog 9).—The average secretion of the pouch for four hours after the test meal was 26 c.c.; free acidity, 75; total, 95. The animal was fleshy and very lively.

The roentgen-ray dosage given was the same as for Dog 3. The animal did not vomit.

Fig. 1.—Chronic intestinal ulcers that were present in Dog 2; the lower one in the duodenum, the upper one in the ileum. The animal received slightly more than a dog's erythema dose.

The first day after the exposure, the dog responded normally to the test meal; the appetite was good.

On the second and third days, there was anorexia. The continuous secretion contained free acid, but the gastric secretory response to 1 mg. of histamin was reduced approximately 10 per cent.

The fourth day, the animal ingested all of the test meal, and secreted 31 c.c. of gastric juice; free acidity, 90; total, 100. The response to 1 mg. of histamin was normal.

From the fifth to the twenty-eighth day, the appetite was excellent; the weight was normal, and the general condition good. The gastric secretion was normal.

The twenty-ninth day, there was definite polyphagia, and clay colored stools of much consistency were passed. The gastric secretory response to the test meal in four hours was 104 c.c.; free acidity, 120; total, 130. The amount of the secretion had been steadily increasing for the last week. The dog secreted so much that it was necessary to inject atropin to prevent saturation of the bandages.

The forty-sixth day, the animal had lost much weight; marked polyphagia was present, and copious clay colored stools of cold mush consistency were passed daily. Fibrous pancreatitis was suspected. The gastric secretory response to test meal was 98 c.c.; free acidity, 115; total, 130.

The fifty-second day, the animal was very cachectic, weak, and would not eat.

The fifty-third day, death occurred. Necropsy when the body was cold revealed that there were five areas of congestion in the duodenal mucosa measuring approximately 4 mm. in diameter. There were numerous hyperemic longitudinal streaks in the ileum and the colon. These changes may have occurred post mortem, as they are frequently seen in dogs dying from other causes. All the organs were normal grossly, except the pancreas. The pancreas was very small, hard, and weighed 4.4 gm., which is from one sixth to one seventh of the normal size. The bladder urine showed 0.2 per cent. sugar.

GROUP 3.—PROTOCOLS ON TWO DOGS RECEIVING APPROXIMATELY 75 PER CENT. OF A HUMAN ERYTHEMA DOSE OF ROENTGEN RAYS OF SHORT WAVE LENGTH

EXPERIMENT 10 (Dog 10).—The average secretion of the pouch for four hours after the test meal was 13 c.c.; free acidity, 40; total, 60. The animal was in fine condition and very lively.

The roentgen-ray dosage given was the same as for Dog 3, except the time of exposure, which in this case was 90 minutes. There was no vomiting after the exposure.

The first day after the roentgen-ray exposure, the animal ingested all the food, but vomited it. The secretion amounted to 12 c.c.; free acidity, 20; total, 35.

The second day, the dog only lapped food, but secreted 15 c.c. of juice; free acidity, 50; total, 70. The dog vomited later in the day.

The third day, there was complete anorexia. The continuous secretion contained no free acid.

The sixth day, the animal ingested a little of the test meal and secreted 12 c.c.; free acidity, 5; total, 20.

The eighth day, the appetite was normal. The dog secreted 14 c.c. of juice; no free acid; total, 10.

From the thirteenth to nineteenth day, the dog was in good condition. There was no free acid in secretion. The juice had a peculiar, unpleasant odor.

The twenty-eighth day, the dog was in good condition. The animal secreted 13 c.c. of juice; free acidity, 5; total, 20.

At this time the animal is still alive and healthy.

EXPERIMENT 11 (Dog 11).—The average secretion of the pouch for four hours after the test meal was 16 c.c.; free acidity, 20; total, 50. The animal was in excellent condition, and was very fat and lively.

The roentgen-ray dosage given was the same as for Dog 10. The dog vomited about one hour after the exposure.

The first day after the roentgen-ray exposure, the animal had an excellent appetite and secreted 16 c.c. of gastric juice; there was a trace of free acid; total, 20.

The second day, the dog ate the meal slowly without appetite. The animal secreted 12.5 c.c. of juice; free acidity, 30; total, 55.

The third day, there was complete anorexia and vomiting; the continuous secretion contained no free acid.

The sixth day, the appetite was good. The animal secreted 9.5 c.c. of juice; free acidity, 15; total, 35. The dog had lost weight.

From the seventh to the thirteenth day, the animal secreted 12 c.c. of juice; free acidity, 20; total, 35.

From the thirteenth to the twenty-eighth day, the animal secreted 14 c.c. of juice; free acidity, 55; total, 80.

At the present time the dog is in good condition, but has lost weight since the exposures; this may or may not be due to them.

RESULTS

The dose of roentgen rays administered to the two dogs in Group 1 was chosen because it had previously proved to be an erythema dose for dogs. Although Dog 1 received seven minutes' more exposure than Dog 2, the skin reaction in the two was quite similar, a first degree burn resulting in both. As was to be expected, the intoxication was more acute in Dog 1 than in Dog 2. The sequence of events in both animals was quite similar: (1) immediate vomiting and partial anorexia; (2) complete anorexia and anacidity, beginning from two to three days after the exposure and persisting for about five days; (3) return of appetite and gastric secretion to normal for a period; (4) four or five days prior to death, which occurred at three and seven weeks, respectively, recurrence of complete anorexia and achylia, the animal being very cachectic. Intestinal ulcers were found in both animals.

Fig. 2.—Section through the intestine of Dog 8, which received one human erythema dose of roentgen rays of short wave length. Villi absent and crypts dilated; in some crypts the epithelium is degenerated, in others there is much mitosis; hyperemia, which does not appear in the illustration, present.

The dose of roentgen rays administered to the seven dogs in Group 2 was chosen because it is a known human erythema dose of roentgen rays of short wave length. The sequence of events was: (1) immediate vomiting, which occurred in four of the seven animals; (2) partial anorexia and hypernormal secretion of gastric juice during the first two days following exposure, which occurred in five of the seven animals; (3) partial or complete anorexia, hyposecretion and anacidity, beginning on the third day and continuing for two or three days, which occurred in all the animals; (4) recovery or death, depending, we believe, on the vitality of the animal at the time of the exposure. We have been unable to find any criteria of the vitality of the animal other than its general behavior. Four of the seven animals died in from six to fourteen days of acute roentgen intoxication. The three that recovered from the immediate effects gradually lost weight. One died from hemorrhage as the immediate cause of death at one month; the second died from fibrous pancreatitis at two months, and the third died of experimental intersusception at three months. Chronic intestinal ulcers were not found at necropsy in any of these animals.

The dose of roentgen rays administered to the two dogs in Group 3 was chosen because it is a usual "unit dose" employed in the treatment of malignant tumors. These animals reacted quite similarly with respect to immediate symptoms and effects on gastric secretion, to the dogs in Group 2, but a hypernormal gastric secretion did not occur, and the symptoms of acute intoxication were mild. The depression of gastric secretion was very definite, however.

Gross and microscopic changes of the intestinal mucosa were present in most of the animals studied. A gross change in the pancreas occurred in only one animal (Dog 9), in which there was extreme atrophy and fibrosis. We regret not having made a histologic study of the pancreas of all of our animals, as fibrosis is a very common biologic sequel of roentgen-ray exposure.

The histologic examination[7] of the intestinal tract of dogs exposed to a dog's erythema skin dose and to a human erythema skin dose, respectively, bears out in the main the findings of Warren and Whipple[8] on the sensitivity of the mucosa to the roentgen rays. Warren and Whipple found that the crypt epithelium suffered first, and showed evidence of necrosis and solution before any change became apparent in the epithelium covering the villi. In our studies we did not follow the early changes; i. e., during the first four days. Our studies began with the fifth day. In none of our material, however, could we find evidence of greater destruction of the epithelium in the crypts. In every case in which the mucosa was not completely sloughed, the crypt epithelium was relatively well preserved, while the villi were either present as naked polypi or obliterated. It would appear, therefore, that although the crypt epithelium may show earlier changes, the villous epithelium suffers relatively the greater damage.

The changes produced by a dog's erythema skin dose and by a human erythema skin dose were practically alike except in the degree of injury. The dog's erythema skin dose (from two and one-half to three times greater than the human) produced complete sloughing in patches, leaving the surface of the intestine exposed as deep as the muscularis mucosae. With the human erythema skin dose, complete sloughing was not observed, but the villi were either obliterated or completely denuded of epithelium. When the villi were

7. The research was aided in part by the loan of equipment to us by the Standard X-ray Company.

8. Warren, S. L., and Whipple, G. H.: J. Exper. Med. 35: 187 (Feb.) 1922; ibid. 38: 713 (Dec.) 1923.

destroyed, the mouths of the crypts apparently were closed and a cystic condition was produced. The dilated crypts contained an exudate and varying numbers of polymorphonuclear leukocytes.

When the villi were destroyed, there was a little infiltration of the mucosa, but in certain cases in which the villi showed less extensive injury by the roentgen rays, a very dense infiltration of large macrophages was observed.

Another striking feature of the roentgen ray injury is the paralyzing effect on the fibroblasts. These show hypertrophic changes, but do not divide or produce collagen. Ordinarily, their response to injury is almost immediate. This delayed response of the fibroblasts after roentgen-ray exposure has also been observed by Maximow.[9]

The changes in the epithelium of the crypts are also extensive. Goblet cells disappear. The columnar cells enlarge, appear relatively clear, and usually take a slightly basic tint. Certain cells, however, undergo a colossal increase in size, usually take eosin strongly, and contain a large nucleus with one prominent nucleolus. In some instances they may fuse together, producing large, multinucleated masses. The statement regarding goblet cells should be modified to this extent, that it is only in those cases in which the villous epithelium is destroyed that the goblet cells disappear from the crypts. In instances of less injury to the villi, the goblet cells appear more numerous and contain large amounts of mucus. This has also been observed by Martin and Rogers.[10] There is always a decided hyperemia. Evidences of hemorrhage are present, and small thrombi can be seen. The endothelial cells lining both blood vessels and lymphatics show enlargement and protrude knob-like into the lumina.

Fig. 3.—Section through intestine of Dog 8 from another area in the intestine, showing swelling of the villi with degeneration and absence of the epithelium at their tips. The cells of the crypt epithelium show some mitosis and some degenerative changes.

Lesions produced in the intestines by roentgen ray are refractory and do not heal readily. The dog under observation longest (fifty-four days) showed no evidences of repair. This has been noted also for lesions of the skin and stomach. The failure of the epithelium to regenerate and so cover the denuded area is not readily explained. It may possibly be due in part to the failure of the connective tissue to respond in a normal manner. Consequently, the epithelial elements lack a healthy stratum over which they may migrate and organize an epithelium.

A comparison of the effects of the dose given to the animals in Group 1 and Group 2 is interesting in that it shows that it is the "depth dose" and not the "skin dose" that is causing the damage of the intestinal mucosa, since the "skin dose" administered to the animals in Group 1 is approximately two and one-half times that administered to the second group of animals. Another factor that varied in these two groups is the size of the portal and the area of the intestines exposed, it being greater in the second group than in the first. It is quite possible that the surface area of the intestinal mucosa exposed might be a very important factor. The recent work of Martin and Rogers[10] confirms this view. These factors may explain some of the discrepancies that apparently exist between experimental and clinical observations, because in the treatment of malignant tumors of the abdominal viscera only a portion of the abdomen is exposed, and roentgen rays of short wave length are used; hence, roentgenologists frequently observe the immediate symptoms observed in dogs, and only infrequently observe acute roentgen-ray intoxication, cachexia and intestinal ulcers.

Although we are convinced that the general vitality of the animal is a very important factor in determining the course of the symptoms and the end-results following exposure of the abdomen to roentgen rays, we believe that the condition of the mucosa of the intestinal tract at the time of exposure also is an important factor, because the anatomic changes in the mucosa are in most instances in our experience confined to small areas instead of being diffused throughout the entire intestinal mucosa.

In comparing these results of the effects of roentgen rays on the intestine with our previously reported results on the stomach,[6] we find that the intestinal mucosa is approximately two times more sensitive to roentgen rays than the mucosa of the fundal portion of the stomach. Also, a human erythema dose of roentgen rays of short wave length causes changes in the intestine of the dog that do not lead to the formation of chronic ulcers.

The negative results on exposure of the thorax to roentgen rays are not surprising in view of the observations of other workers.[11] The absence of any effect on gastric secretion on exposure of the thorax has also been observed by Portis and Ahrens.[12]

The hypernormal secretion that occurred in most of our animals on the first and second days after the exposure of the abdomen was observed by Seego and Rother [13] in a gastric fistula dog, and by Miescher [14] on a Pawlow pouch dog. The depression of gastric secretion has been reported by every one who has been interested in this problem,[15] but Ivy and Orndoff and Portis and Ahrens have been the only investigators who have attempted to differentiate between the effect on gastric

9. Maximow, A. A.: J. Exper. Med. **37**: 319 (March) 1923.
10. Martin and Rogers: Am. J. Roentgenol. **11**: 280, 1924.
11. Warren and Whipple (Footnote 8). Denis, Martin and Aldrich: Am. J. M. Sc. **160**: 555 (Oct.) 1920.
12. Portis and Ahrens: Am. J. Roentgenol. **11**: 272, 1924.
13. Seego and Rother: Ztschr. f. d. ges. exper. Med. **24**: 270, 1921.
14. Miescher, G.: Schweiz. med. Wchnschr. **52**: 303, 1922; Strahlentherapie **15**: 252, 1923.
15. Wachter: Strahlentherapie **12**: 556, 1921. Seego and Rother (Footnote 13). Miescher (Footnote 14). Ivy, Orndoff, Jacoby and Whitlow (Footnote 1, second reference). Portis and Ahrens (Footnote 12).

secretion of the exposure of the stomach and the intestines separately. Their work shows that it is much easier to affect gastric secretion by the exposure of the intestines to roentgen rays than by the exposure of the stomach itself.

These changes in gastric secretion (hypernormal secretion followed by anorexia, achylia or hyposecretion, and then a return to normal in spite of cachexia, if the animal lives) can be explained in part by known observations. It is well known that toxemia depresses gastric secretion, and all must grant that a toxemia results after a certain amount of radiation over the intestine. Anorexia is the most important factor in the causation of the hyposecretion, but the reduced response to histamin stimulation during this period shows that the gastric secretory mechanism is to some extent fundamentally depressed by the toxemia. The hypernormal secretion is more difficult to explain, because it occurred only when a meal, or a part of a meal, was ingested, which means that the hypernormal secretion could not be due to the absorption of secretagogues from the injured intestinal mucosa or contents, as is the case in intestinal obstruction;[16] for if such were the case the continuous secretion should have been augmented as well as the digestive secretion. Such augmentation of continuous secretion occurred in only two of the animals. This means that the hypernormal secretion is due to a disturbance of the factors concerned in the genesis of the secondary phase of gastric secretion. The two most probable factors are an increase in the irritability of the intestinal mechanism concerned in gastric secretion[17] or a reflex pylorospasm from the injured or irritated intestinal mucosa.

Fig. 4.—Section through the pancreas of Dog 9, which received a human erythema dose of roentgen rays of short wave length; almost complete degeneration of the acinar tissue with marked fibrosis; islets are present and appear normal. The duct present in this section contains cellular debris.

The cause of the marked hypernormal secretion of gastric juice that developed in Dog 9, along with the atrophic fibrous pancreatitis, was undoubtedly due to the uncontrolled acid stimulation in the intestine[17] caused by the absence of the neutralizing effect of pancreatic juice.

Immediate vomiting has occurred in our dogs, just as it is observed to occur in man. It has occurred only in dogs that have had their abdomen exposed. So we feel that the vomiting that occurs in some patients toward the end or immediately following their treatment cannot be attributed to smelling the ozone or to psychic causes. We believe that this vomiting occurs too soon to be accounted for by absorption of toxins, which undoubtedly explains vomiting when it occurs from the first to the fourth day after the exposure. We are of the opinion that this vomiting is due to a vasomotor disturbance in the gastro-intestinal area. In our work on the submaxillary gland,[2] we observed vasomotor changes, and we have seen the mucosa of the rosette of the Pawlow pouch blanch toward the end of a treatment. Campbell and Hill[18] have recently observed the occurrence of stasis in capillaries exposed to the action of ultraviolet light. Since partial asphyxia increases the irritability of nerve endings, such vasomotor changes in the gastro-intestinal area might excite reflex vomiting.

The clinical course observed in our animals after exposure of the abdominal area to roentgen rays is not unlike that observed by Warren and Whipple[8] and Martin and Rogers.[10] Slight variations are due to differences in dosage and variability in the individual susceptibility of the animals. Our observation that the vitality of the animal is an important factor in determining the reaction is a factor quite generally known and carefully considered by roentgenologists.

All investigators who have made anatomic studies of the intestine after roentgen-ray exposure are agreed that definite degenerative changes are produced. The detailed description varies, which we believe is due to dosage and time factors. The effect on the mucus forming goblet cells, which are always distended with mucus if destruction is not too extensive, is quite characteristic, being observed by Mottram,[19] Warren and Whipple,[8] Martin and Rogers[10] and ourselves. This is further evidence of the irritant action of roentgen rays, as mucus secretion in general is increased by irritants.

Our observations have a direct bearing on the cause of "roentgen cachexia." In the course of our studies, we have had eleven animals die in cachexia, three after extensive irradiation of the submaxillary gland area, three after large doses over the Pawlow pouch, and five after exposure of the intestines. Injections of sodium chlorid, recommended in the literature, were without beneficial results in the two animals in which they were made. The most plausible theories that have been advanced are that the cachexia is due to a toxemia, to anorexia, to diminished digestive power and to irreversible blood changes. We can say quite definitely from our results that it is not due to anorexia, because these animals eat sufficiently and sometimes voraciously; that it is not due to a disturbance of the blood picture, because that has been normal in the animals studied; that it is not due to disturbed gastric digestion, which is quite evident from our results. Mottram, Cramer and Drew[20] observed a disturbance of fat absorption in rats exposed to radium, which they thought was due to lymphopenia. Martin and Rogers[10]

16. Dragstedt, L. A., and Dragstedt, C. A.: Acute Dilatation of the Stomach, J. A. M. A. 79: 612 (Aug. 19) 1922.
17. Ivy, A. C., and McIlvain, G. B.: Am. J. Physiol. 67: 124 (Dec.) 1923.
18. Campbell and Hill: J. Physiol. 58: 28, 1924.
19. Mottram, J. C.: Proc. Roy. Soc. Med. 45: 41, 1923.
20. Mottram, J. C.; Cramer, W., and Drew, A. H.: Brit. J. Exper. Path. 3: 179 (Aug.) 1922.

have also reported an inhibition of fat absorption in dogs after exposure of the intestine to roentgen rays, which they explain as being due to injury of the intestinal mucosa and to increased mucus production. In view of the fact that in Dog 9 the pancreas was almost completely destroyed, it seems evident that the disturbance of fat absorption is due, at least in part, to the absence or depression of pancreatic secretion. The pancreas is the next gland to be studied in our series.

So cachexia following exposure of the abdomen may be due not only to a chronic intoxication but also to disturbed intestinal digestion.

The exposure of the abdomen to roentgen rays has been used to reduce the acidity of the stomach in the treatment of ulcer of the stomach and duodenum.[21] The doses used have varied from 20 per cent. to a full erythema dose. It may be possible to find a dose that suppresses gastric secretion when directed into the abdomen—but not over the stomach itself—without causing irreparable injury of the intestinal mucosa; but it is our opinion that such treatment is to be condemned, when there are inoffensive agents that can be used for the same purpose.

CONCLUSIONS

1. Exposure of the thorax of Pawlow pouch dogs to roentgen rays sufficient to cause a first degree burn has no effect on gastric secretion and causes no symptoms.

2. A similar dose delivered over the lower abdomen causes a temporary anacidity or hyponormal secretion associated with anorexia, followed by a return to normal of gastric secretion and appetite, with a progressive loss of weight and cachexia. Necropsy shows chronic ulcers of the intestine.

3. A human erythema dose of roentgen rays of short wave length delivered over the abdomen causes a hypernormal secretion of gastric juice lasting one or two days, followed by anorexia, hyponormal secretion and sometimes diarrhea, followed on the fifth day by normal gastric secretion and appetite. This dose causes death in from six to fourteen days in dogs that are not in perfect condition.

4. Seventy-five per cent. of a human erythema dose—the usual "unit dose" used in the therapy of malignant tumors—caused mild acute symptoms of intoxication associated with anorexia, anacidity and hyposecretion.

5. The observations of others on the sensitiveness of the intestinal mucosa to roentgen rays are confirmed, the intestinal mucosa being at least twice as sensitive as the fundal mucosa of the stomach.

6. Our findings do not warrant the use of roentgen rays for treatment of conditions in which it is desirable to reduce gastric acidity.

ABSTRACT OF DISCUSSION

DR. CHARLES L. MARTIN, Dallas, Texas: Unfortunately, the secretory changes observed by the authors do not explain the clinical condition known as "treatment sickness." Their supposition that such a malady could be due to vasomotor changes occurring during treatment is most interesting and deserves further investigation, which I hope they will undertake. The absence of changes in the white blood cell counts of their animals is somewhat surprising to me. Guinea-pigs given a lethal dose of roentgen rays over the abdomen usually show a marked leukopenia before death, although the red cell count changes very little. I can suggest only one criticism of this work; namely, that it does not apply directly to the patient. The body of a dog is much smaller than that of a human being, and its abdominal wall is considerably thinner. Consequently, the application of a human erythema dose to the dog's abdomen over a relatively large area leaves us in doubt as to whether the dose received by the intestine is similar to that received at the same point in the body of a patient under treatment. In order to meet this difficulty, Dr. Rogers and I have performed a number of experiments on isolated loops of intestine in the living animal under anesthesia. When such a loop, shielded from the rest of the body by lead, received a human erythema dose, no ill effects were observed. However, exposures exceeding one and one-half erythema doses caused ulceration in the mucosa. Animals in which this ulceration occurred showed a steadily progresive cachexia and usually died in from three to five months after exposure, in an extremely emaciated condition. While studying such cachexias produced in rabbits subjected to abdominal irradiation with Dr. Denis in 1920, I observed a marked suppression of urine output, although no kidney damage could be demonstrated. In our recent experiments we have shown that fat absorption is inhibited in heavily irradiated isolated loops of intestine, whereas mucus production is markedly stimulated. However, the interference with fat absorption can hardly be due to pancreatic injury as suggested by Dr. Ivy, since the pancreas was protected by a lead shield. Biologic reactions following irradiation certainly deserve a more intensive study than we have thus far accorded them.

DR. CLAUDE REGAUD, Paris, France: I am extremely interested in the work of Drs. Ivy and Orndoff, because of the previous work along that line which I did about twelve years ago, in collaboration with Drs. Loescho and Lacasin. I was anxious to study the reactions on dogs and other mammals. The most interesting results were obtained. I found that under the conditions previously imposed I was able to prevent any reaction or destruction of the skin, while producing very marked effects on the mucosa of the stomach and intestines. The results were different with the massive doses than with the smaller doses, administered as Dr. Ivy and Dr. Orndoff illustrated. The results differed again, depending on the large surface area employed. The results depending on diffuse secondary lesions were not known then, while today they are well understood and explain some of the symptoms not explainable at that time. In experiments that produced the death of dogs in four or five days, I noticed very acute gastric and abdominal symptoms, such as vomiting, bloody stools and perforated ulcers in the stomach and intestine. With weaker doses, the chronic cachexia, reported by Dr. Martin a few minutes ago, followed.

PROF. A. J. CARLSON, Chicago: The idea that one can with a given dose of roentgen ray stimulate an organ or gland to increased activity is nonsensical. The work done so far on the salivary glands and on the stomach has demonstrated no possibility whatever of stimulation from the roentgen ray. If closer association were made in the future between the experimental worker in the laboratory and the clinician, we should make better progress. The trouble with many practicing physicians of today who graduated fifteen, twenty or twenty-five years ago is that they think that physiology is something that has to do only with the frog. Physiology in 1924 is quite a different animal.

DR. A. C. IVY, Chicago: We stated in a former publication that we have confirmed the histologic findings of Dr. Regaud that the parietal cells were more resistant than the chief cells of the fundal mucosa of the stomach. The parietal cells, however, are supposed to form hydrochloric acid, and the chief cells pepsin. We find that these normal histologic appearing parietal cells do not form hydrochloric acid, which shows that we cannot always make physiologic deductions from histologic findings. We do not doubt that absorption from the intestine is altered when such marked changes as those reported occur, and we believe that the results of Drs. Martin and Rogers adequately demonstrate a disturbed absorption of fat. In reporting the occurrence of atrophic

21. Wachter (Footnote 15). Bryan, L., and Dormody, H. F.: Am. J. Roentgenol. 8: 623 (Nov.) 1921. Bruegel: München. med. Wchnschr., p. 670, 1916. Matoni, H. H.: Med. Klin. 19: 1220 (Sept. 9) 1923.

fibrous pancreatitis in one of our animals, we wanted only to emphasize that a disturbance of intestinal digestion may also play an important, but not necessarily an essential, rôle in disturbances of absorption, and may be a contributory factor concerned in the cause of cachexia. In our last experiments in which we used 75 per cent. of a human erythema dose of hard roentgen rays, we believed that we had conditions that are analogous to the clinical situation, and that a patient would show achylia or hyposecretion, possibly preceded by a slight hypernormal secretion, when given similar treatment. We hope that clinicians will make observations on their patients to ascertain whether our work on the dog is borne out by observations on man. It is true that leukopenia occurs for a short period after exposure; but this was of such common knowledge that we failed to mention it. We mentioned the blood picture only to show that it was normal at the time our animals showed cachexia.

SPLINTING AND PHYSIOTHERAPY IN INFECTIONS OF THE HAND

ALLEN B. KANAVEL, M.D.
CHICAGO

The immediate problem of overcoming an infection of the hand is so likely to overshadow the question of the ultimate function that the surgeon may neglect what to the patient is the paramount consideration. Incisions properly made are of great importance; but, from the inception of the treatment, procedures should be instituted that prevent adhesions and disability.

The fingers and hand should have both active and passive movements daily, at least after the first forty-eight to seventy-two hours. Hot moist dressings should not be continued after the danger of spreading is ended; generally two or three days after incision will suffice. Attention to this detail will lessen the amount of round cell infiltration. After hot wet dressings are discontinued, baking under an electric light or therapeutic lamp for a half hour three times daily will help to overcome the infection as well as to reduce the congestion.

Fig. 1. — Position of function.

PROPHYLACTIC TREATMENT

Position of Function.—To my mind, one of the most important factors in the care of infected hands is the maintenance of the hand in the "position of function" throughout the treatment. The hand should never simply be surrounded by hot dressings and permitted to lie in an extended position. It should be maintained in dorsal flexion at the wrist at an angle of 45 degrees; the phalanges at the metacarpophalangeal and phalangeal joints should be flexed to the same angle, and, most important, the thumb should be abducted from the palm and adducted toward the ulnar side of the hand, and rotated so that the flexor surface of the thumb is opposite the flexor surface of the index finger (Fig. 1).

This position should be maintained throughout the treatment except when the hand is undergoing physiotherapy. It may be secured by various means. In one method that I have used, a splint is attached to the back of the forearm, and is bent backward at the wrist at an angle of 60 degrees, with arms extending at the sides of the hand to hold a palmar support that passes

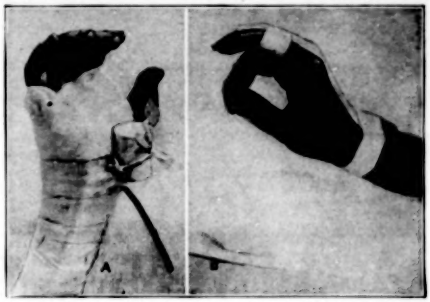

Fig. 2.—*A*, palmar "cock-up" splint with thumb fixed in the "position of function"; *B*, finger fixed in the "position of function."

across the palm, between the ends of the metacarpal of the fingers and the thumb. This holds the hand in dorsal flexion and the thumb away from the palm. A sling about the thumb, attached to the ulnar side of the palm piece, rotates the thumb and holds it adducted toward the ulnar side. Such a splint interferes only slightly with treatment of the palmar wounds, and can be removed and replaced easily. The same position may be secured by rolls of gauze or a roller bandage placed in the palm, or by a palmar "cock-up" splint held in place by bandages or adhesive straps (Fig. 2).

Such a dressing, however, should be used only in an emergency and should be early supplanted by the more satisfactory splint described or others designed for the same purpose. If such a splint were in universal use, much less would be heard of disability after hand infections. If the hand is kept in the "position of function," even though only a minimum of motion of the fingers and thumb is retained, the patient will still have a useful hand for gross purposes. The importance of this procedure cannot be overestimated.

If a finger alone is involved and it is evident that the tendon will be lost or ankylosis of joints follow, the finger should be held flexed at the metacarpophalangeal and interphalangeal joints at about 30 degrees flexion (Fig. 2). This degree of flexion is slightly less than the position of function, but the subsequent contraction of scar tissue will increase the flexion to the best position of function for the finger. Even with loss of the tendon, voluntary flexion and extension at the metacarpophalangeal joint is seldom lost.

Restoration of Function.—When the hand has healed with some disability due to adhesions about tendons and joints, or loss of tissue, we have before us the problem of the restoration of function. In almost all cases by either nonoperative or operative treatment, or by a combination of both, considerable, if not complete, function can be restored. An extended experience

with the severe cases requiring operative procedures directed to relieving ankylosis of joints, adhesions about tendons and nerves, and the restoration of lost tendons has confirmed the belief that in these most complicated conditions sufficient function may be secured to satisfy the patient, although it may fall short of what the surgeon would desire. It is a functioning hand that the patient desires, and he is not critical of minor details. In many disabilities, moreover, much can be done by nonoperative procedures, so much, in fact, that many types previously submitted to operative procedures are now entirely treated by these simpler methods. The operative treatment will be considered at another time.

Nonoperative treatment consists essentially in the use of physiotherapy supplemented by the use of various types of splints designed to bring the hand and fingers into the "position of function," stretch tendons and fibrosed muscles, and mobilize adhesions. By these means, many of the milder types can be almost entirely restored to function, and the severe types can be benefited.

Each case presents individual problems, so that no single splint can be devised that will answer in all cases. Certain principles, however, may be established, and splints devised by the surgeon to meet the requirements peculiar to each patient. One should always remember that the vitality of the tissue is low and that such hands will not bear the pressure that can be borne by ordinary tissue. In some, even the lightest pressure will produce local necrosis; therefore, all splinted hands should be examined daily, and on the appearance of the slightest mottling of the tissue, the splint should be removed.

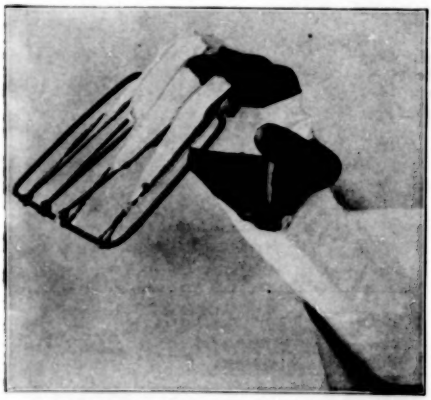

Fig. 3.—Extension carried beyond the fingers.

Gentle, constant traction or pressure should be the rule, rather than forcible measures. This may be secured by elastic bands, springs or packing between the splint and the part whose position is to be corrected. Forcible manipulation followed by the use of splints to hold the parts in the new position may at times be used, but is generally inadvisable since the reactive inflammation produces new adhesions and contractures. The splints should be light, not cumbersome; they should be easily removed and reapplied by the nurse or physiotherapist.

In our service the splints are generally made from aluminum and heavy wire, and what they lack in workmanlike appearance they gain in their adaptation to the needs of the individual patient. Such splints can be bent from day to day as the changing condition of the patient's hand demands. All that is necessary in making such splints is sheet aluminum, heavy scissors, rivets, piano felt, leather for straps, and the ordinary tools, such as a file, hammer and punch. The splint can then be cut into any shape desired, with extended

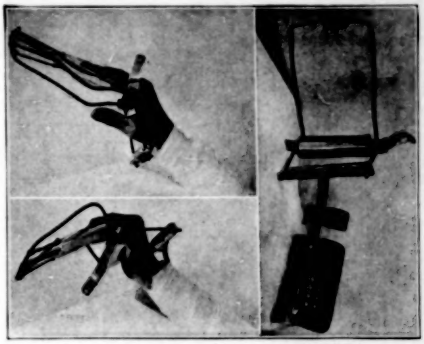

Fig. 4.—Splint and various types of finger extensions.

arms bent to carry elastic extension from the fingers or thumb as may be needed to meet the individual requirements. Given a patient with a contracted hand, fingers or thumb, the surgeon should study the problem as to how the splint must be constructed to bring the hand and fingers into the "position of function" by either elastic or spring traction or pressure, and then design the splint to meet these requirements.

TYPES OF SPLINTS

It may be of aid in the solution of this problem if certain types of splints are described, if one remembers that in any given condition the splint may be modified to meet the exigencies of the case. The "cock-up" position of the hand should first be obtained. Where there is no bony ankylosis at the wrist, this can generally be obtained by applying a straight splint to the flexor surface of the forearm, molded to fit the contour of the forearm, with an extension into the palm, bent dorsad as far as possible, to give pressure in the palm. The splint being firmly fixed to the forearm, small pads of piano felt are slipped between the splint and the palm, so as to increase the thickness from day to day, and the palmar part is bent dorsad as extension of the wrist is gained. We find that if an extension made of heavy wire attached to the splint is carried beyond the fingers, an added factor of value is secured, in that the fingers can now be extended or flexed by means of an elastic extension attached to the fingers through loops of adhesive tape, or gauze attached to the fingers by Sinclair glue. Extension so applied helps to stretch the adhesions of the wrist; and, as the splint is bent dorsally, helps to produce a "cock-up" position of the wrist (Fig. 3).

This type of extension is particularly applicable in those cases in which adhesions are also present in the interphalangeal joints, since it stretches them also. If

the fingers are fixed in flexion, they are being straightened at the same time the wrist is being extended. Lewis, Varrell and others have described somewhat similar splints.

Again, the same result may be secured by placing a V-shaped splint on the flexor surface of the hand and forearm, the two ends resting with flat surfaces covered

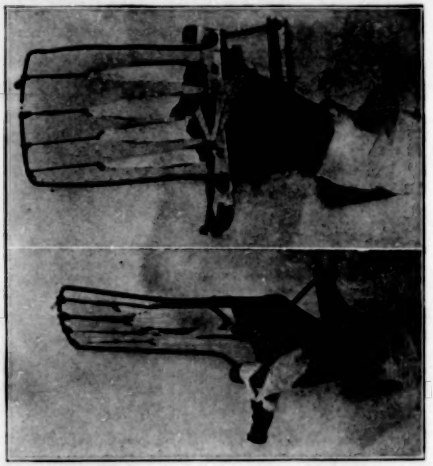

Fig. 5.—Splint with finger and thumb attachments.

by piano felt on the middle of the forearm and the heads of the metacarpals, and the convexity distant about 2 inches from the wrist. If tension is placed on the back of the wrist, drawing the wrist into the angle, a "cock-up" position is secured. The tension is generally secured by a bandage around the wrist and angle, reinforced by a rubber band applied with moderate tension. For this purpose a small piece of the ordinary Martin bandage is used. To this also the finger extension mentioned above may be added.

In other instances we have used an aluminum splint fixed to the dorsum of the forearm with an arm extending away from and over the back of the hand; to this is riveted a cross bar extending laterally beyond the edges of the hand. The rivet is loose enough to permit changing the angle of the cross bar with the longitudinal bar, so as to fit the oblique line made by the different lengths of the metacarpal bones of the right or left hand. In the palm is placed a small roll of aluminum about an inch in diameter. This is fixed by threaded bolts at the ends to the ends of the cross piece described above. A nut above and below the cross piece permits the tension on the palmar piece to be increased at will. This gradually produces extension of the hand.

If desired, a U-shaped extension, similar to that used in the Lewis splint, may be added and flexion or extension of the fingers be secured at the same time. The Lewis splint itself may be used to produce the same effect as the splint here described. Again, an extension may be thrown out from the radial or ulnar side and the thumb extended or flexed through elastic tension into whatever position may be desired (Figs. 4 and 5).

Probably the greatest difficulty is found in correcting the overextension of the proximal phalanges. Several methods have been suggested to produce this result; and while in some cases in which the dorsal tendons have been bound down and great change has taken place in the metacarpophalangeal articulation an open operation may be necessary, yet in most, satisfactory results will be obtained by splinting.

Dickson, in the *British Journal of Surgery*, has described a method of effecting this result. The principle of the treatment is that the metacarpophalangeal joints are gradually flexed by adding pressure pads of piano felt while held by plaster. The wrist is dorsiflexed as much as possible, and the whole hand, forearm and elbow are incased in plaster after suitable padding. Not too much padding should be used; otherwise, the splint will become loose. The plaster is applied so as to flex the fingers as much as possible, and is reinforced by extra layers of plaster on the dorsal and flexor surfaces. The inclusion of the elbow in the splint is important; otherwise, the splint may slip and cut into the hand during the wedging process. When the plaster is properly set and has had a day to dry, the portion under the flexor surface of the palm is cut away and the edge smoothed off so that it will not cut into the palm as the fingers are flexed. Felt pads are now wedged between the posterior slab and the dorsal surface of the first phalanges. These pads are held in position by adhesive plaster to prevent slipping. It will be seen that the finger tips are free, and the patient is instructed to

Fig. 6.—The Dickson splint.

keep pulling them to increase the flexion. In two or three days the fingers will be found quite loose, and more pads are added. This process is continued until the metacarpophalangeal joints are fully flexed. The fingers and palm must be examined frequently to make sure that no pressure sore is developing. When the maximum flexion is secured, the joints are usually

held in this position for a week to ten days in order that any local reaction may subside and to make sure that the structures are thoroughly stretched (Fig. 6).

METHODS OF FLEXION

The flexion is maintained by the following method. The dorsal part over the finger is cut away, and the

Fig. 7.—Dickson splint with spring attached.

felt pads are removed. A piece of metal with a V cut in the top to act as guide for the wire is incorporated in the plaster on the flexor surface opposite the wrist joint. Another piece of metal with a ring is fixed near the elbow. A leather-covered and padded metal bar is then placed over the heads of the proximal phalanges, and from the center of this a wire runs through the metal V and is attached to the spring attached to the ring. By adjusting the spring, sufficient force can be applied to keep the fingers flexed. Owing to the position of the fingers and the direction of the force, there is no tendency whatever for the bar to slip off the ends of the fingers. Attention is drawn to the fact that the bar rides on the heads of the proximal phalanges, and the pull is approximately at right angles to the shaft of the bone, which is mechanically most efficient.

The flexion-retaining bar can be removed for massage and physiotherapy. The bar is reapplied after treatment.

After about ten days' treatment, the plaster cast is removed and replaced by a short plaster "cock-up" and laced leather elbow case. The elbow case fixes a strap just above the condyles of the humerus to which the spring is fastened. Movements of the elbow are not then restricted on account of the position of the strap. If the spring is tightened when the elbow is flexed, there is only a slight increase in the tension when the elbow is extended. (It might be mentioned, at this stage, that the fixation of the elbow for from four to seven weeks in the initial stages has not as yet resulted in any limitation of its movement.) By means of this splint, the metacarpophalangeal joints are kept in full flexion until the normal function of the joints is established. At the same time, the patient has full advantage of the various baths, massage, etc. In the final stage, in order to obtain the flexion of the interphalangeal joints, tapes may be used instead of the bar; but they must not be employed before flexion of the metacarpophalangeal joint is assurred, because, if the proximal phalanx is in an extended position, the greater percentage of the force applied causes only an impaction, and not any real flexion of the metacarpophalangeal joint. As was pointed out previously, the ability to retain the flexion voluntarily is the indication for the removal of the splint, and any tendency to relapse is an indication for further splintage.

Bunnell produces flexion in the overextended proximal phalanx by a dorsal oblique V-shaped splint with ends rising on the back of the hand and the phalanges. This is padded to prevent excessive pressure. Tension is secured by bandaging about the splint and the palm, and drawing the metacarpophalangeal joint up into the concavity of the splint.

If the fingers are flexed and held by fibrosis about the joints, extension is maintained by a splint of the type suggested by Sinclear and others. It consists essentially of a U-shaped splint of heavy wire extending beyond the finger ends with the arms attached to one or two strips of tin or aluminum extending on to the forearm. This being attached to the forearm by adhesive plaster and bandages, extension is secured by rubber bands extending from perforations in the wire to the fingers, being attached to the latter through loops in adhesive straps or gauze attached to the fingers by Sinclair glue. The rubber bands are shortened as the fingers extend.

The same result may be obtained by a dorsal aluminum splint with an extension over the dorsum of the fingers, with rubber bands attached to each finger through perforations in the end of the splint. In this case no glue or adhesive straps are required, since a simple leather loop can be placed on the fingers.

This splint has the advantage that it can be readily removed for physiotherapy, can be modified to meet conditions peculiar to each finger, and is very easily

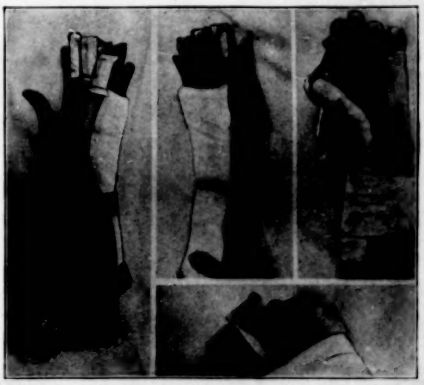

Fig. 8.—Extension by loops.

made, and is not so cumbersome as the Sinclair splint (Fig. 8).

When the fingers are held in extension, a flexor splint similar to the foregoing answers the purpose admirably; indeed, I have used it with satisfaction in overextension of the proximal phalanx, the extension into the palm being bent at whatever angle away from the fingers one wishes the extension to be exerted on the

phalanges (Fig. 9). As flexion increases, the palm extension is bent farther oack, changing the angle of tension. In other cases of finger extension in which some flexion has been secured, the action is continued or the position maintained by adhesive straps run along the dorsal surface of each finger, and drawn down to the forearm with the wrist in flexion. The natural tendency for the hand to become extended draws on the fingers and increases the tension.

Probably as satisfactory a method as any, at this stage, is the use of the leather glove with the wrist reinforced by stiff leather, and with leather straps attached to the ends of the glove fingers and fastened to buckles sewed on the wrist portion of the glove (Fig. 10). It is realized, however, that this does not give continuous tension such as is obtained by rubber bands or springs. Therefore, its use is not advised except in the final stage of treatment, or to maintain what has already been accomplished by elastic tension. At times I have used elastic tension on the glove instead of the straps, but its use here is not as satisfactory as when it is attached to a rigid splint.

The malpositions of the thumb produce great disability, and here our endeavor should be to abduct the thumb from the palm and rotate it so that the flexor surface of the thumb comes in opposition to the flexor surface of the finger. This we have endeavored to do by attaching arms to the various splints described, which extend from the hand in such a manner that an elastic tension can be secured in the direction desired. In cases in which the thumb alone is involved, a splint may be attached along the radial side of the forearm with a free extension over the thumb, and the rubber tension produced through a leather loop around the thumb (Figs. 4, 8 and 9).

Fig. 9.—Extension into various positions by loops.

The thumb must generally be rotated and, if the splint suggested will not rotate it sufficiently, I have placed adhesive straps on the back and ulnar side of the thumb and rotated it by elastic tension fixed to the ulnar side of the hand or an arm of the splint thrown out on that side. In simple cases, a leather loop thrown about the base of the thumb and attached through elastic extension to the ulnar side of the hand at about the site of the wrist joint will suffice.

COMMENT

This general discussion of splints will illustrate the principles on which the splints are built. Each case will demand special devices or modifications or combinations of the splints described. The physiotherapy consists, in brief, of massage of scar tissue, diathermy, development of muscle function by massage, stimulation with the galvanic and faradic current, and passive and active motions. The use of apparatus, devices, of machines directed to the same ends, as, for instance, the use of the typewriter, the piano, dumb-bells, pulleys and ladders, in fact any device that will stimulate the patient to use the hand in a purposeful manner and sustain his interest, is of the utmost importance. The sustained interest that these cases arouse in the surgeon is due to the demand for ingenuity in the care of each patient. Each one presents new problems to be solved, but the results obtained by painstaking care and constant attention will fully reward the conscientious surgeon for what may seem to be an undue demand on his own time, since the care of the patient cannot be left to the untrained assistant. The splints must be examined frequently to see that the tension is adequate and in the proper direction, that no pressure sores are developing, and that the patient is securing the physiotherapy indicated in each condition.

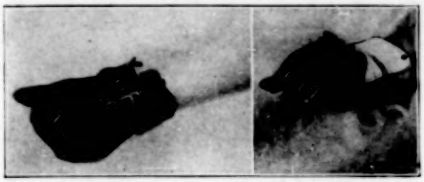

Fig. 10.—Glove flexion and dorsal extension by loops.

54 East Erie Street.

PERINEAL PROSTATECTOMY

WITH PARTICULAR REFERENCE TO SACRAL ANESTHESIA AND TO HEMOSTASIS *

EDWIN DAVIS, M.D.
OMAHA

Measures tending toward the lessening of the hemorrhage hazard and the shock hazard, and providing better opportunity for operative exposure and deliberation, should tend toward lessening the sum total of surgical mishaps, and toward better functional results. There are obvious reasons why such measures are particularly indicated in the operation of prostatectomy, which has to deal so frequently with human derelicts. With full realization that in prostatectomy the chief opportunity for the saving of lives lies rather in the preoperative treatment than in the operative technic, this paper is presented with the purpose of directing attention toward two variations in operative methods: (1) the use of sacral anesthesia in perineal prostatectomy, and (2) the use of a distensible rubber bag designed for hemostasis following perineal prostatectomy.

In all surgical procedures, complete hemostasis is primarily dependent on deliberate, careful dissection

* From the Department of Urology, University of Nebraska College of Medicine.

* Read before the Section on Urology at the Seventy-Fifth Annual Session of the American Medical Association, Chicago, June, 1924.

under visual control and with minimum trauma; and on accurate ligation or suture of all bleeding points, with no trust in chance. There is no valid reason why prostatectomy should be an exception to these principles, particularly since it is possible, by the use of local anesthesia, to relieve the necessity for haste and blind trauma and to provide the opportunity for deliberation.

The operation of prostatectomy has an additional problem, peculiar to itself: that of temporarily maintaining pressure within a newly formed cavity. For this purpose, the advantages and disadvantages of the gauze pack, after both the suprapubic and the perineal route, and the value of the Hagner or the Pilcher bag after the suprapubic route, are familiar to all. While it is quite true that postprostatectomy bleeding will usually cease spontaneously, and with no precautions on the part of the operator, yet the hemorrhage hazard remains a real one, and the surgeon sleeps best who knows that this important item has not been left to chance.

PERINEAL PROSTATECTOMY UNDER SACRAL ANESTHESIA

In general surgery, the advantages and the possibilities afforded by the various forms of local anesthesia have long been recognized by all. There has, however, been a tardiness in the attainment of local anesthesia to the place it properly deserves, owing in a large measure to the reluctance of the average busy surgeon to devote the time and careful attention essential to the successful application of this method. Keener competition in surgery promised by the future, and the growing enlightenment of the public, should tend toward the more general adoption of local anesthesia.

Considering the age and debility of the average candidate for prostatectomy, it is in this procedure that the employment of any method tending to lessen the shock and the insult of operation becomes doubly urgent. For the operation of prostatectomy, sacral anesthesia is ideally suited. This applies particularly to prostatectomy by the perineal route, because no additional infiltration anesthesia is necessary.

Fig. 1.—Anatomic dissection with entire dorsal surface of sacrum removed, exposing dural sac and nerve roots as they lie in the sacral canal: *D*, dural sac terminating at level of second sacral segment; *R*, first sacral nerve root; *V*, vessels occupying foramen together with nerve root; *S*, needle inserted through sacral hiatus into sacral canal; *N*, cauda equina.

History.—We are not here primarily concerned with a consideration of the history and the development and the technic of sacral anesthesia, since these subjects have been thoroughly and admirably covered by others. Credit is due to Harris [1] for early mention of sacral anesthesia in America, in 1915. One year later, Lewis and Bartels [2] directed attention to the value of sacral anesthesia as applied particularly to urologic manipulations and operations, including prostatectomy. Among several others, we are indebted particularly to Scholl [3] and more recently to Meeker and his co-workers, who, in a series of papers,[4] have elaborately covered the subject as to history, anatomy, technic, and fields of application.

Crowell,[5] in 1922, described the use of sacral anesthesia for perineal prostatectomy; hence I do not claim priority in this method.

Definition.—There exists a confusion of terms and ideas relative to the exact anatomy concerned in sacral anesthesia, and as to the relations of dural sac, nerve roots and sacral canal and foramina. It is primarily essential to distinguish between spinal and sacral anesthesia, and to recall that the spinal injection is given within the spinal canal into the subarachnoid space, where it mingles with the cerebrospinal fluid. This method involves a certain definite mortality, admitted by its most enthusiastic advocates. The sacral method differs essentially in that the injection is extradural, and in that the mortality is a negligible factor. An estimate as to the infrequency of mishap following the sacral or extradural injection may be obtained from the work of Zweifel,[6] analyzing the reports of ten fatalities occurring among 4,200 cases, and concluding that in only three of these was the anesthesia responsible. In these three, death was almost immediate, and resulted apparently from acute procain poisoning.

Anatomy.—It will be recalled that, within the sacral canal, the dural sac terminates at the level of the second sacral segment, while, below this level, the nerve roots continue on their course downward to their respective sacral foramina, each enclosed in its separate sheath of dura. Figure 1 is a photograph of an anatomic dissection, showing the laminae of the fourth and fifth lumbar vertebrae and the entire dorsal portion of the sacrum removed, exposing the dural sac and nerve roots. The needle is shown entering the sacral canal through the membrane covering the sacral hiatus, which is the gap resulting from failure of fusion of the laminae of the fifth sacral segment. The black color of the dural sac and nerve roots is due to a dye injected before the dissection was begun, and hence indicating the extent of the normal diffusion and distribution of the anesthetic solution. Thompson [7] showed by colored injections given in a series of cadavers that the average height of the extradural ascent of the dye was the level of the third dorsal vertebra, and that in some cases the lower cervical level was reached.

Technic.—Details of the technic of injection have been admirably covered by other publications, particularly those of Meeker, and need not be here repeated.

1. Harris, M. L.: Nerve Blocking, Surg., Gynec. & Obst. **20**: 193, 1915.
2. Lewis, Bransford; and Bartels, Leo: Caudal Anesthesia in Genito-Urinary Surgery, Surg., Gynec. & Obst. **22**: 262 (March) 1916.
3. Scholl, A. J.: Sacral Anesthesia in Urology, J. Urol. **6**: 149 (Aug.) 1921.
4. Meeker, W. R.: Regional Anesthesia in Surgery of the Prostate Gland and Bladder, Journal-Lancet **44**: 1 (Jan. 1) 1924. Meeker, W. R., and Bonar, B. E.: Regional Anesthesia in Gynecology and Obstetrics, Surg., Gynec. & Obst. **37**: 816 (Dec.) 1923.
5. Crowell, A. J., and Thomson, R.: Sacral Anesthesia in Perineal Prostatectomy, J. Urol. **8**: 81 (July) 1922.
6. Zweifel, E.: Fatalities After Sacral Anesthesia, Zentralbl. f. Gynäk. **44**: 140 (Feb. 7) 1920; abstr., J. A. M. A. **74**: 1138 (April 17) 1920.
7. Thompson, J. E.: Anatomical and Experimental Study of Sacral Anesthesia, Ann. Surg. **66**: 718 (Dec.) 1917.

The term epidural injection refers to the use of a single needle inserted into the sacral canal through the sacral hiatus, as indicated in Figure 1. The trans-sacral method involves the injection of each of the five posterior sacral foramina on either side. Theoretically, each of these methods should accomplish the same purpose; that is, the saturation of all of the nerve roots in procain solution. For practical purposes, to make more certain of a complete and thorough permeation of the drug, it is well to use a combination of the two methods. Of the prostatectomies here reported, a few were satisfactorily done following the simple epidural injection; but, in the majority of cases, both epidural and trans-sacral injections were given. Some of the patients received preliminary hypodermic narcosis; others none at all, and were operated on equally painlessly. The necessity for the preliminary use of narcotic drugs depends on the mental make-up of the individual patient, and its purpose is for the relief of apprehension and fear and to do away with the discomfort of the position on the operating table; not for control of pain due to operative manipulation.

Fig. 2.—Distensible hemostatic rubber bag for use following perineal prostatectomy. *A*, large, stiff-walled drainage tube, passing directly through from apex of bag to center of base, without communicating with interior; *B*, small tube for distending bag; *C*, traction loop of rubber for attaching tape; *D*, tape for traction; *E*, oval perforated piece of metal for counter-traction against surface of perineum; *F*, screw-clamp for maintaining traction.

Failures.—There occurs a certain small but constant percentage of failure to obtain complete anesthesia. This percentage decreases as technic improves, yet this fact constitutes probably the most serious objection to sacral anesthesia.

There are several factors tending toward poor or indifferent anesthesia, which may be eliminated by careful technic. Certain cases of failure are due to the fact that the operator has not succeeded in introducing the needle through the hiatus and into the lumen of the sacral canal. It is even possible to make the mistake of giving the injection into the subcutaneous tissues dorsal to the sacrum. It is essential to remember that, when the end of the needle is properly placed within the canal, the fluid will flow freely, and will require no pressure on the plunger of the syringe. Those cases in which forceful injection is necessary are those of failure to anesthetize. It is likely that in some of these cases the tip of the needle is within the canal but under the periosteum, because rotation or slight withdrawal of the needle will sometimes permit free introduction of the fluid. Another common error is the omission of an interval of time between the injection and the incision. Anesthesia will be unsuccessful unless a period of thirty or forty minutes is allowed to elapse, which probably represents the time necessary for the penetration of the dural sheaths of the nerves.

Proper selection of cases, and preoperative hypodermic narcosis when necessary, will largely reduce the percentage of so-called failures. There are those patients whose mental attitude is such as to render impossible the use of local anesthesia for any purpose whatever. Such patients draw no distinction between fear, the discomfort of the position on the operating table, and actual pain. Preliminary narcosis with morphin and scopolamin, while not essential as a routine for the patient of average intelligence, is of great value in eliminating the difficulties due to fear and apprehension.

Results in Perineal Prostatectomy.—In the series of thirty cases of perineal prostatectomy under sacral anesthesia here reported, there have been no post-operative sequelae or poor results attributable in any way to the anesthesia. Wound healing has been uniformly good. From the standpoint of the success and the completeness of the anesthesia, results have been classified as follows:

1. Perfect: Manipulations as painless as with general anesthesia.
2. Good: Some complaint, associated with discomfort due to the lithotomy position; inhalation anesthesia not necessary.
3. Fair: Incision and manipulation of exposure painless, but pain produced in last stage of operation as a result of traction and trauma incident to enucleating the lobes, and requiring temporary gas inhalation.
4. Failure: Little or no local anesthetic effect obtained, probably as a result of faulty technic; a general anesthetic was necessary throughout.

According to this classification, twenty-one among the series of thirty were perfect, two were good, in four the results were fair, requiring the aid of gas inhalation during the brief period of trauma and traction associated with enucleation, and the remaining three were complete failures. The cause for complete failure to obtain anesthesia could not be accurately ascertained, but it is only reasonable to suppose that the difficulty lay in errors in technic, due to failure to introduce the needle properly into the canal and foramina.

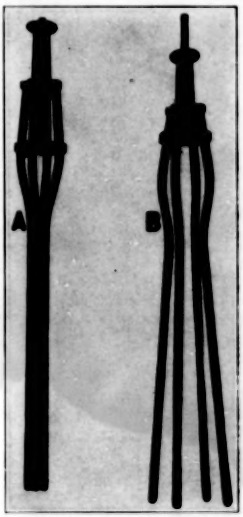

Fig. 3.—Dilating instrument for facilitating introduction of bag through posterior prostatic capsule and internal sphincter into bladder, after completion of enucleation: *A*, closed; *B*, opened, preparatory to introduction of bag.

There were two deaths, both of which might well have been avoided by better statistical foresight, since the age and physical condition of these patients was such that one would have been fully justified in refusing to operate. One of these was a man, aged 77, with complete urinary retention, and with a renal func-

tion well below the level of safety, which failed to improve satisfactorily even after three months of continuous drainage. This patient did well temporarily, but died in sepsis on the tenth day. The second death occurred in a patient, aged 91, with a fair renal function and with no apparent cardiac disturbance. His postoperative condition was excellent until within five minutes of death, which occurred very suddenly and which was preceded by respiratory symptoms such as to suggest pulmonary embolus. Necropsy in this case was negative.

Convalescence.—As outlined above, there is a great satisfaction to the surgeon during the operation in the knowledge that time for operative deliberation and hemostasis may well be afforded without danger to the patient. Consequences and complications resulting from prolonged anesthesia need be given no consideration. Of greater importance, however, is the fact that, with sacral anesthesia, the patients pass through no period of postoperative shock. Their condition on returning to bed, as measured by pulse, respiration, color and general appearance, is not essentially changed from that prior to operation. To observe one of these patients reading or eating during the afternoon following operation is not unusual. Furthermore, the sum total of postoperative discomfort and pain is less, presumably because of a persistent analgesic effect. The pain caused by the removal of the hemostatic bag twenty-four hours later (and the gauze, if any) is in no way comparable to the pain produced by a similar procedure following general anesthesia. In the series of thirty, the average number of days before (1) sphincter control, (2) urethral voiding and (3) closure of the perineal fistula was five, seven and twenty-one, respectively. There is therefore no reason for supposing that the sacral anesthesia interferes in any way with wound healing or with the return of the normal function of urination.

DISTENSIBLE RUBBER BAG FOR HEMOSTASIS FOLLOWING PERINEAL PROSTATECTOMY

Description of Bag.—The rubber bag shown in Figure 2, designed for use following perineal prostatectomy, resembles in principle that of the Hagner or the Pilcher bag, and differs in no essential excepting that, in the absense of a suprapubic fistula it became necessary to make adequate provision for urinary drainage. This was accomplished by a large through-and-through tube, *A*, passing from the apex of the bag to the center of the base; not communicating with the interior; larger in caliber than the corresponding tube in the Pilcher bag, and with walls of sufficient thickness to withstand the compression due to the distending fluid. The smaller tube, *B*, through which the bag is distended, is made to communicate with the interior at a point near the apex rather than at the base, in order to facilitate withdrawal through the perineal, rather than through the suprapubic fistula. The traction loop, *C*, for maintaining the position of the bag, and later for facilitating removal, is attached to the large tube just at its junction with the apex. A tape, *D*, passes through a loop, *C*, and through a hole in the center of an oval piece of metal, *E;* and traction is maintained by means of a screw-clamp, *F*, the oval metal, *E*, having been placed flush with the skin surface immediately after closure of the incision.

Operative Technic.—We are not here primarily concerned with a discussion of the technic of perineal prostatectomy, which has been so often and so admirably described by Hugh H. Young, and modifications of which have been recently described by Hinman,[8] Cecil,[9] Geraghty,[10] and by Young[11] himself. Suffice it to say that the posterior prostatic capsule is exposed by the usual method, advantage being taken of the opportunity afforded by the local anesthesia carefully to isolate and ligate bleeding points. In order to obtain adequate exposure of the posterior surface of the prostate, it is frequently necessary to divide in a transverse direction a few fibers of the levator ani muscle, which pass to either side of the membranous urethra. Here, vessels worthy of ligation are often encountered. After exposure of the posterior capsule of the prostate, it is not unusual to observe large veins coursing in a tortuous manner over its surface. In incising the posterior capsule preparatory to exposing the posterior urethra and the lateral lobes, instead of deliberately cutting through these veins, time is well spent in making an effort either to divide and ligate, or to push them to each side, together with their enveloping connective tissue.

The next step is the incision, through the posterior capsule, into the posterior urethra, turning back a

Fig. 4.—First three dressings, dried and photographed, obtained from two of the cases in the series. The amount of black color indicates the total postprostatectomy bleeding: Case *A* was one of the prostatectomies which may be literally termed "bloodless"; Case *B* was the one showing the greatest amount of bleeding in the entire series.

V-shaped flap of capsule, which carries with it ejaculatory ducts, verumontanum and the posterior surface of the mucosa of the prostatic urethra. The detailed technic of the enucleation of the adenomatous masses, together with a discussion of the various modifications to suit each individual case, has been elaborately gone into by Young and others mentioned above, and does not fall within the province of this paper. These authors have demonstrated that this technic permits as complete and as satisfactory a one-piece enucleation of the adenomatous tissue as is possible by the suprapubic route; and includes no blind trauma, better visual control, less damage to the internal sphincter, and better preservation of the mucosa of the prostatic urethra. After completion of the enucleation, there remains protruding into the prostatic cavity a cuff of urethral mucosa, continuous above with the bladder mucosa.

8. Hinman, Frank: Structural Results of Prostatectomy with Reference to Methods of Enucleation, Arch. Surg. 4:154 (Jan.) 1922.
9. Cecil, A. B.: Perineal Prostatectomy—A Detailed Study of One Hundred Consecutive Cases, J. Urol. 6:399 (Dec.) 1921.
10. Geraghty, J. T.: A New Method of Perineal Prostatectomy Which Insures More Perfect Functional Results, J. Urol. 7:339 (May) 1922.
11. Young, H. H.: The Technic of Prostatectomy and Its Relation to Mortality, J. A. M. A. 78:933 (April 1) 1922.

On this edge of mucosa, there is again afforded the opportunity for picking up and ligating bleeding points.

Introduction of Bag.—The introduction of the bag in the average case may be very simply and quickly accomplished. Using as a guide the left index finger, which has been introduced through the incised capsule, and the terminal phalanx of which has been hooked over the posterior sector of the internal sphincter, one easily passes the rubber bag, folded into a long curved clamp, through the dilated sphincter and into the bladder. Immediately after the bag has been distended with water, traction on the tape is begun, and is maintained throughout closure by an assistant, and thereafter by countertraction against the perineum by means of the oval metal and screw-clamp described above. Just as is the case with the suprapubic bag, the process of distention and traction causes an immediate cessation of bleeding, as a result of pressure maintained on the torn edges of the bladder mucosa, together with obliteration of the prostatic cavity. It is then possible to close the wound in dryness. The bag is of additional hemostatic value in that it maintains direct downward traction on the floor of the bladder, thus compressing the periprostatic tissues. The amount of distending fluid injected within the bag may be varied. From 50 to 60 c.c. will suffice for the average case. More fluid may be used in case there is a larger cavity, resulting from an unusually large adenoma.

As stated above, seldom is serious difficulty encountered in introducing the bag, simply by use of a guiding index finger and a clamp. In the unusual case, however, the sphincter may be deeper, less relaxed and more inaccessible, and, under these circumstances, the instrument shown in Figure 3 for dilating and holding open the internal sphincter will facilitate introduction. This instrument is 12 inches in length, and, as is indicated, the blades may be approximated or separated by a thumb screw. The technic of use requires no detailed explanation. This instrument is a convenience, but seldom a necessity.

The routine closure used includes the approximation with catgut sutures of the left side of the inverted V incision in the posterior prostatic capsule, the right side being left open for the passage of the two tubes and the traction tape, and later for the withdrawal of the collaped bag. Similarly, only the left limb of the inverted V skin incision is closed.

In no case did the amount of packing exceed two 1 inch gauze strips, 1 foot in length. In the earlier experimental cases, in the presence of slight ooze, it was considered too radical to depend entirely on the bag. Later, in nine cases no gauze pack whatever was used.

Removal of Bag.—The routine postoperative care is as follows: Approximately eight hours after operation, the traction on the tape is released. This permits the distended bag to slip from the prostatic cavity back into the bladder, where it may be used again, if necessary. One hour later, the bag is allowed to collapse by the removal of the screw-clamp from the small tube. About the twenty-fourth hour following operation, the gauze strips, if any, are withdrawn, and then the collapsed bag, in case there is no bleeding. As long as the collapsed bag remains in situ, there remains the opportunity for redistending and renewing traction, should the necessity arise. There was no occasion for this procedure in the small series here reported.

At this point, attention should be directed to an advantage of the sacral anesthesia, afforded presumably by its persistent analgesic effect. Some of these patients may complain of a sense of tension, relieved by release of traction on the bag, but the sum total of postoperative discomfort is distinctly less than following a general anesthesia. This fact is brought clearly to our attention by the relatively slight amount of pain caused by the withdrawal of the gauze and the bag, twenty-four hours after operation.

Hemostatic Results.—The postoperative bleeding in twelve out of a total of sixteen of these cases was literally nil, and in these cases it would not be an exaggeration to apply the term "bloodless prostatectomy." The others showed slight or moderate ooze, but in no case was the hemorrhage alarming or even sufficient to attract attention. Since terms descriptive of the amount of bleeding may be subject to such a wide range of interpretation with different individuals, the first three dressings from the original ten cases have been dried and preserved as a matter of record. Figure 4 is a photograph of the first three dressings from Cases A and B, which happen to be the two cases in the series that showed the least and the greatest amount of bleeding, respectively. The three dressings were removed approximately eight, ten and twenty-four hours after operation, and indicate the total amount of postoperative bleeding. The dressings from Case B show a small amount of clotted blood, while those from Case A are saturated merely with pink-tinted urine. The comparative "bloodlessness" of these dressings can be appreciated only by those familiar with the amount of postprostatectomy bleeding ordinarily seen in uncontrolled cases.

Convalescence.—In this small series, the average number of days before (1) sphincter control, (2) urethral voiding and (3) the closing of the perineal fistula was five, seven and twenty-one, respectively. There is therefore no reason for supposing that the bag in any way interferes with wound healing or with the return of the normal function of urination.

Postoperative epididymitis has been conspicuous by its complete absence. This is a feature worthy of note. Although the series is small, the number of cases is sufficient to indicate that there need be no anxiety that the presence of the bag in the posterior urethra may tend to increase the frequency of epididymitis. In fact, it is possible that the prevention of continuous urinary saturation of the freshly traumatized tissues during the first few postoperative hours may be a factor in lessening the incidence of epididymitis.

SUMMARY

Sacral Anesthesia.—1. This method, in sharp contradistinction to spinal anesthesia, has no appreciable mortality.

2. Applied to prostatectomy by the perineal route, in more than 75 per cent. of cases this method of anesthesia will permit painless completion of the operation, without local infiltration, without resort to the aid of inhalation anesthesia, and, in the favorable cases, even without the aid of preliminary hypodermic narcosis.

3. The elimination of the necessity for the haste required with general anesthesia, with consequent opportunity for care, deliberation and hemostasis, is of great aid to the operator, and hence of indirect benefit to the patient.

4. Postoperative shock is conspicuously absent.

5. There are no delayed ill effects, either general or with regard to wound healing.

6. The postoperative discomfort following sacral anesthesia is distinctly less than after a general anesthetic.

7. There are two possible objections or contraindications to the use of sacral anesthesia:

(*a*) The injection of the sacral canal and the sacral foramina requires a fair degree of technical skill and practice, and the method is time consuming in that an interval must elapse between injection and incision.

(*b*) There occurs the occasional case of inexplicable failure to obtain satisfactory anesthesia.

Hemostatic Bag.—1. Preparedness for the control of postprostatectomy bleeding is not essential as a routine, but in the occasional case it is highly desirable.

2. The bag here described, designed for use following perineal prostatectomy, differs from the Hagner or Pilcher bag in that there is a large, stiff-walled, through-and-through tube to provide for urinary drainage; and in that traction is maintained by a direct pull on the surface of the perineum, rather than by the urethra.

3. Following perineal enucleation, this bag is inserted through the prostatic urethra and the internal sphincter into the bladder. After distention and traction for several hours, the bag is allowed to relax and collapse, and is withdrawn after twenty-four hours.

4. In a series of sixteen cases there has been no postoperative bleeding of consequence. Twelve of these prostatectomies were "bloodless." In nine, no gauze was used.

5. There has been no difficulty in the removal of the bag, no delay in wound healing, no interference with restoration of normal sphincter action, and no epididymitis.

VALUE OF CAUTERY PUNCH OPERATION IN REMOVAL OF VESICAL NECK OBSTRUCTIONS

ITS EFFECT IN REDUCING PROSTATECTOMY*

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In May, 1920, the cautery punch operation, with infiltration anesthesia of the vesical orifice, was presented by one of us (J. R. C.) before the American Association of Genito-Urinary Surgeons, as a method of removing lesser degree obstructions and attention was centered particularly on the so-called median bar type, which was found, according to a study of pathologic reports by Randall and Lowsley, to be about 14 per cent. of all obstructions at the bladder neck, and from our personal study of 494 clinical cases, to occur in 20 per cent. After concentrating attention on this particular type of obstruction, and becoming more and more familiar with the bladder neck picture, we observed a gradually increasing number of general thickenings around the bladder neck, which were designated as collar obstructions. The various degrees represented different forms of vesical neck contracture and were classified as bars, small, medium and large collars, and lobular protrusions. It was made definitely clear that the large intravesical lobes were not applicable to such a method.

In January, 1923, a critical analysis of 100 cases in which operation was performed by this method was presented[1] before the New York Urological Society. This analysis showed an increasing field of usefulness for such a method in what was termed borderline cases, that is, those in which the growth was so pronounced as to make the prediction of the type of surgery somewhat speculative. After this method had been applied to many such obstructions, it was soon demonstrated that many of these involvements were satisfactorily relieved by the cautery punch method. In the analysis of 150 cases, reported before the New England Urological Society and the American Association of Clinical Genito-Urinary Surgeons in 1923, the gradual application of this method to larger obstructions was demonstrated. Since this time there have been twenty-five operations, making the total to date 175. In the latter group of twenty-five cases there have been eight

Fig. 1.—Specimens removed from one patient by repeat operations.

patients with very pronounced obstructions, which formerly in our hands were treated only by prostatectomy, and we feel sure are treated throughout the country by similar means. In the previous 150 cases, there were twelve of this type, bringing the total of these larger obstructions operated on by the cautery punch to twenty. The results have proved so gratifying as to establish an even broader field of application for this type of surgery, with a growing tendency to reduce the number of prostatectomies for bladder neck obstructions. Indeed, in the last six months this method has been applied to more than 50 per cent. of all obstructions that have come under our observation. Let us summarize the symptoms and diagnostic findings of the 175 patients on whom this operation has been applied. There were twenty-four patients, or 13.7 per cent., under 50 years of age. More than 60 per cent. were between 60 and 75 years of age. There were nine patients over 80 years old.

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* Because of lack of space, this article is abbreviated in THE JOURNAL. The complete article appears in the Transactions of the Section and in the author's reprints.

1. Caulk, J. R., and Sanford, J. H.: J. Urol. 11:45 (Jan.) 1924.

SYMPTOMS

Frequency of urination during the day occurred in 65 per cent.; night frequency in 96 per cent., the average night frequency being four times; a diminution in force and size of stream in 95 per cent. Pain on urination occurred in 63 per cent.; dribbling at the end of urination in 40 per cent. In 15 per cent. of the patients, blood was passed in the urine. Fifteen patients had complete retention and were on catheter life. There were eleven more who gave a history of previous retention. Incontinence of urine was present in eighteen patients, or about 10 per cent. History of chills and fever was given by 21 per cent. Twenty-two per cent. were definitely uremic. Of these there were fourteen patients who were extremely ill, carrying large residual urine, high blood nitrogen and low phenolsulphonephthalein, who resisted protracted catheter drainage and the usual therapeutic measures to combat uremia, and who, under no condition, could have undergone prostatectomy without the chance of the extremely high mortality. They were operated on by the punch, and in only one instance was there the slightest reaction.

Fig. 2.—Section of tissue removed, showing sclerotic type of obstruction; preservation of mucous membrane may be noted.

Eight patients had suprapubic fistulas. They were all cured by this operation. Two of these patients had been operated on for prostatectomy in other clinics and the first stage had been completed, but the patients were in such serious condition that the second stage was not undertaken. One had drained suprapubically for six months. Cystoscopically, there was a small collar obstruction and very little rectal enlargement. After the removal of a section from the median portion of the orifice, the fistula healed within one week, although it had failed to close with a catheter. This patient has remained entirely well for two years. A second patient had drained suprapubically for nine months, and after three operations, with the removal of numerous pieces from the orifice, the fistula closed and urinary function was established. Several months later he contracted pneumonia and died. We were fortunate in securing a partial necropsy. The bladder orifice was smooth and soft, showing no evidence of scarring. Indeed, we feel sure that no one would have suspected a previous operation.

It is evident, therefore, that the age of the patients and the symptoms are identical to gross obstructions. The frequent occurrence of such obstructions at the two extremes of the prostatic age makes such an operation very valuable. As previously stated, there were twenty-four patients under 50, and nine over 80, or approximately 20 per cent., who were either too young for the accepted prostatectomy age or too old and depleted to tolerate such surgery. The group of younger patients in this series had all received local treatment without relief, and, with two exceptions, were completely cured by means of the punch operation. This group of patients has offered a great problem in treatment because they resist local therapy, and are certainly not subjects for major surgery.

It is in this early class of obstructions that the cystoscopist so often fails, or misinterprets. In the elderly patients this operation serves most admirably. In the nine patients beyond 80, the majority had been refused operation. They were all in very serious condition, and were operated on by this method without the slightest reaction. We do not wish to be understood as saying that a man beyond 80 cannot undergo prostatectomy, yet such an age adds a great hazard to the operation, and these patients were all extremely bad risks. There were numerous other patients in the middle group from 60 to 80, who were secretory suicides, and on whom prostatectomy would have been a serious undertaking. It can thus be seen that the age of the patient and the symptoms are identical to the gross obstructions and offer no index as to the type of involvement. There have been fourteen patients who had previous operations. There were three perineal prostatectomies; seven suprapubic prostatectomies; three suprapubic cystotomies; one suprapubic with radium implantation, and nine patients to whom prostatectomy had been advised as the only chance of cure. In other words, twenty-three patients of the 175 had either been operated on unsuccessfully or advised major surgery.

Fig. 3.—Section of tissue removed showing glandular type; preservation of adenomatous tissue may be noted.

In previous communications, we have considered these obstructions as being different degrees of contracture, and divided them into the bar and collar types. It was at first our impression that the bar obstruction

was the more common. Recent studies demonstrate the preponderance of the definite collar involvements. Indeed, as the orifice of the bladder is carefully observed, it is very rare, even in a typical bar, not to see some puffiness encircling the whole orifice. The collar obstructions may be for convenience divided into four classes (Fig. 4).

The first class shows slight vesical ingrowths completely encircling the neck, appearing cystoscopically as thickenings, and in no place allowing the orifice to be flush with the bladder wall.

The second class is more pronounced, and has added to this circular arrangement enough bulging to be creative of shallow clefts, particularly above.

The third degree shows considerably more intravesical bulging, with deeper clefts, and forms the borderline cases between major and minor surgery, requiring a most careful examination.

The fourth degree comprises the dense scleroses, or the so-called true vesical neck contractures. This type of orifice is usually associated with very magnified symptoms, marked frequency, urgency and tenesmus. This has been the type which has been difficult of correction and prone to recurrence.

Recently, we have applied the cautery punch operation to an increasing number of these borderline cases with lobular protrusions, and even in moderate lateral lobe obstructions, with the most gratifying results. Heretofore, any cleft above between two lateral lobes was supposed to be contraindicative to such surgery, all such cases being dealt with by prostatectomy. With patience and care, we feel sure that a large number of such involvements may be removed by minor surgery. We do not wish to convey the impression that large intravesical lateral lobes may be treated in such a manner; but, unless one is careful in the interpretation of such an orifice, an overestimation of its extent is likely to occur. If the intravesical protrusions seem thin, and not rounded and thick, a great many can be removed. In other words, if the involvement seems delicate enough to engage in the slot of the instrument, it can usually be effectively eliminated. In lateral lobe obstructions, it has always been felt that such an incision of the orifice would be meddlesome, and likely to increase obstruction, by allowing the lobes to fall together instead of producing benefit. This, of course, would be true if the incision were made in the median line alone, in case of a bar obstruction associated with bilateral growth; but with lateral incisions, with removal of portions of the lateral lobes, no such phenomenon occurs. It is to this type of orifice that we are particularly anxious to direct attention, because it offers an increasing application to such surgery, thereby reducing the general group for prostatectomy. Luys [2] has reported remarkable results, even in very large obstructions.

In adenomatous obstructions of this type, we may be quite skeptical as to the final outcome, and probably anticipate reformation of the obstruction. Our only answer to this is that in the patients on whom we have done this operation, reformation has not exhibited itself, as there are several who have gone three years without the slightest evidence of further growth. Indeed, several have shown a gradual diminution.

Since the evolution of prostatic obstruction is a gradual one, we should not anticipate rapid regrowths in the properly selected group of cases. If the patients cooperate with this type of treatment, and are properly followed, a repeat operation may be done at the advent of the slightest return of symptoms. Owing to the simplicity of the operation, and the freedom from hazard and economic loss, most patients would be perfectly willing to submit to such a procedure.

There is no feature of cystoscopy that is more deceptive than the internal orifice of the bladder in prostatism. The first mental picture in visualizing such an orifice is that it is a gross, rounded obstruction, applicable only to major surgery for its correction. If this process is sufficiently extensive, there may be bulging above with the formations of quite pronounced clefts, which would seem to bear out this idea more definitely. This picture is the result in many cases of edema, engorgement and intra-acinous retention, secondary to spasm and muscle tension. Many such orifices under drainage with the catheter show an astounding transformation in a very short time; hence, the importance of repeated cystoscopy. We are all familiar with this change of picture between the first and second stage of a two act prostatectomy. This rapid change was forcibly illustrated recently in a patient with high residual

Fig. 4.—Collar obstruction.

urine, with a very large rectal prostate, the size of a small orange, firm and smooth, typical adenoma, with the cystoscopic picture of large, intravesical bulging. At the first stage the orifice felt very rubbery and swollen. At the second operation there was found to be nothing but a simple contracture of the vesical neck. We have never seen such a remarkable difference of picture. In spite of constant vigilance for this transformation, we were deceived. The case could have been treated by minor surgery. Many of these conditions, which do not subside materially under catheter drainage, will promptly do so after incision of the orifice with the punch. In this way the tension is relieved, and the reaction subsides similar to that seen after suprapubic drainage.

RECTAL EXAMINATION

The prostate on rectal examination, in the first 150 patients, was about normal in size in 73 per cent. and enlarged moderately or considerably in 27 per cent., whereas, in the last twenty-five patients, the prostate has been considerably enlarged by rectal examination in 40 per cent., showing increasing number of larger prostates, which are being subjected to the punch operation. In a similar manner to the cystoscopic appearance

2. Luys: Forage de la prostate.

of the orifice, the prostate is quite deceptive. In a considerable number of these patients the prostates were quite broad and firm, and seemed to suggest gross obstruction, whereas, under catheter drainage or incision of the orifice with the punch, it diminished so materially within a week that one would not realize he was feeling the same organ. Here again edema, congestion and retention had subsided. This feature of prostatism has been entirely underestimated. It has been our observation that this type of prostate, when enlarged, has a tendency to be increased much more in its transverse than in its vertical diameter.

Residual urine was present in all but ten cases, and varied from 60 to 1,500 c.c. Seventy-two patients had over 4 ounces (120 c.c.). Nineteen patients had over 1 pint (475 c.c.), and six of these over 1 quart (950 c.c.). In other words, the residual urine was present in this group of cases with about the same percentage and degree as in other types of prostatism. There is a current conception that a person who does not carry a residual urine is not a subject for surgery. This, of course, is quite erroneous. Some of the most irritable bladders resulting from obstructions often have little or no residual urine, and yet the patients are suffering far more than some of those who carry a high residual urine. In such an instance, the patient's comfort is to be considered, as in other types of surgical disease. Associated conditions, such as trabeculation, stones in the bladder, prostate stones, diverticulum and bladder tumor, have occurred, with about the same percentage as in the gross obstructions. Associated stones were crushed prior to the punch operation. In none of the cases have the diverticula been large; the orifices have been of fair size. They were not removed by open surgery, for the reason that the patients were either bad surgical risks or they were uninfected and causing no trouble.

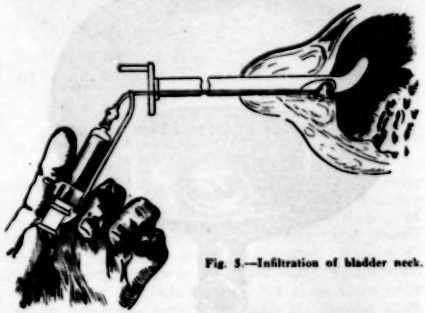

Fig. 5.—Infiltration of bladder neck.

TECHNIC

The technic of the operation is very simple and requires less time than ordinary cystoscopic examination. The instrument is passed into the bladder, the obturator is withdrawn, the urine is evacuated, and, with the left hand grasping the outer rim of the instrument, it is pulled outward and pressed downward so as to engage the obstruction at the internal orifice in the slot. Under the reflected light, this obstruction can be observed and its type, that is, whether glandular or sclerotic, definitely determined. In case of lobules at any part of the orifice which need removal, they can be readily seen in the slot of the instrument, as it is rotated round the circumference of the sphincter. With the tissue in the slot of the instrument, firm pressure against the orifice must constantly be made and at no time should the grip be relaxed. This is the most important step of the whole operation, in order to squeeze in the slot as much tissue as possible and to hold it there. All water is removed from the instrument and the orifice with a suction bulb. Following this, it is swabbed with cotton pledgets until it is perfectly dry. The infiltration needle is inserted along the base of the instrument in order to infiltrate beneath the tissue within the slot (Fig. 5). In this way, anesthesia is effective far beyond the confines of the instrument. Again, the field is made perfectly dry before burning is started. An assistant, who manipulates the cautery, passes the blade, which is then inserted in the outer sheath and introduced as far as the obstruction in the slot. At this time the signal is given, the cautery is turned to its proper heat immediately, and the operator, by rotary motion with forward and firm pressure, burns through the orifice (Fig. 6). The average time for this burning has been four seconds. Immediately, the assistant turns off the current. It is very important to have this release of current done rapidly. By this technic, we have never had the sensation of burning along the urethra, and have never felt the terminal of the instrument hot. For the average bar or simple contracture, the one incision is all that is necessary, and the instrument is removed with the tissue within its slot. When there has been a history of previous bleeding, the evidences of increased vascularity, we sometimes, at low heat, resear the site of operation. If more than one piece is to be removed, the instrument is put farther into the bladder, and the current is turned on moderately to coagulate the tissue within its grasp, in order that it may adhere to the blade. When this is done, the blade is removed and the tissue extracted. Occasionally the tissue fails to stick to the blade. If so, one can insert duck bill forceps down the sheath of the instrument and remove the tissue. Very rarely, it may fall into the bladder; if so, it should cause no concern. We have had this happen but once. The outer sheath is then manipulated so as to grasp the obstruction in some other part of the orifice, and the same technic is employed, with the exception that, if the lobule is lateral or above, the patient's buttocks are elevated, and the external part of the instrument is carried well to the opposite side, or below, depending on whether it is lateral or superior. When removing the instrument, it is important to have the blade in place or reinsert the obturator. One should never remove the instrument without obturation.

The important features of the technic described above are: First, the firm grasp of the orifice within the slot and securing it there until the completion of the operation. Second, a dry field while the burning is being conducted so as to burn and not boil. Third, firm pressure with rotation of the cautery blade during the burning so as to cut through promptly within four seconds.

The proper current for the instrument is the alternating 110 volt.

With care, the instrument is very durable. The original instrument is still in use, and has had no gross repairs since January, 1920.

We have done all of these operations under infiltration anesthesia, with one or two exceptions in cancer. There is really no necessity for general anesthesia except in very rare instances. Sacral anesthesia, while it is very effective for the average manipulation around the vesical orifice, is quite contraindicated in this opera-

tion, since it causes too much relaxation of the neck, and really has a tendency to defeat rather than to help.

Of the 175 operations, 128 have been done in the office, the remainder at the hospital. The operation is so simple, and requires so little time, that it can be done very satisfactorily as an office procedure. However, our only excuse for performing it in the office is that the current is proper, and we are entirely familiar with it. As a general rule it should be a hospital procedure, provided there is an alternating current. Patients are sent by taxicab to the hospital and allowed to remain there from three days to several weeks, depending on associated conditions. In the average simple obstruction, without high residual urine, the patient is allowed to leave the hospital in three days. There has never been the slightest shock or disturbance after this operation. The patients have all stepped from the table, dressed, and walked out. In early obstructions, either bars or collars, it has been the custom, in the last few years, to remove one good piece from the median portion of the orifice. In larger obstructions with lobules, two or more pieces may be removed at one sitting. We have removed one piece in 121 patients, and two or more in fifty-four patients. In the simple obstructions, one piece is sufficient, since the orifice that has been properly cut will retract, so as to prevent further removal in this portion. The multiple pieces were removed from the patients with large medians, or those having lobular protrusions or lateral lobes. There have been repeated operations done on eighteen patients, a little more than 10 per cent. There were five operations done on one patient, four operations on two patients, three operations on two patients, and two operations on the remainder. These repeated operations are done on the larger obstructions, and are the ones that have been responsible for cutting down a fair percentage of prostatectomies. All of these eighteen patients would have formerly been operated on by prostatectomy. This class requires considerable patience and time. Many of them have been extremely bad risks, and not subjects for prostatectomy, and have required several months for the completion of the operation. During this time, however, most of them were not continuously confined to the hospital. The operations were usually done from two to four weeks apart. Several urologists have informed us that they have been unsuccessful in curing some of their obstructions by the punch and, we dare say, if they had continued their operation and removed more pieces, they would have been successful. Two recent patients illustrated the value of the repeat operations. They were both old men, extremely ill. At first, they were both thought to be definite cases for prostatectomy, and not suitable for anything else; but, after failure to respond to drainage sufficiently to warrant major surgery, they were both subjected to the punch operation. Neither was benefited the slightest after the first operation. Several weeks later, cystoscopic examination was done to determine the site of obstruction. In each instance, lateral incisions were made for lobules, two pieces being removed in each from different places of the orifice. One patient, within five days, emptied his bladder to within an ounce, after having previously carried a quart of residual urine. The other patient received absolutely no benefit, and was still compelled to use the catheter, which he had employed for years. This patient, at a later date, had two more pieces removed, with considerable improvement. He began to pass the urine quite nicely, but, in the course of a month, was again compelled to use the catheter. At this time, the cystoscope showed a lobule at about 10 o'clock and another at about 5. These two lobules were removed, and, within a few days, the patient was entirely relieved, and has continued to pass the urine with perfect freedom and empty the bladder completely. These two cases are cited simply to show the value of persistence and patience in following these obstructions.

We have removed as high as sixteen pieces from one orifice without the slightest immediate or remote trouble (Fig. 1). There has been no tendency to dense scarring from the cauterization. Dr. T. F. Laurie of Syracuse informed us recently that a patient on whom he had done the operation died about ten days later, following a stroke of apoplexy. He secured the bladder at postmortem, and said there was complete removal of obstruction, and the orifice was smooth and showed no sloughing or reaction. This is the only specimen showing the early result with which we are familiar, and it serves as direct evidence, not only of the amount of tissue removed, but also of the lack of destruction of surrounding tissues. We have placed retention catheters in about one third of these patients following operation, our chief guide being spasticity and high residual urine. The removal of the catheter depends entirely on conditions. There has been but one primary hemorrhage following operation, and that was due to

Fig. 6.—*A*, orifice engaged in slot of instrument; cautery sheath ready for removal of obstruction; *B*, after burning through orifice.

a faulty instrument. Operation was done at the hospital, and the current was poor. The instrument would not go home properly, the mucous membrane being torn in removal of the piece. The patient had active bleeding for several days. There has not been another patient who gave us the slightest concern about bleeding. There have been a number of mild secondary oozings, anywhere from the sixth to the fourteenth day. There has never been the necessity to evacuate clots until the last week, when two patients, both on their sixth day after operation, had quite lively secondary bleedings with clots; both were promptly stopped by the indwelling catheter. One of these patients started bleeding after a prolonged sexual excitement; the other came spontaneously. These are the only three patients in the 175 who required any attention to bleeding. The two patients with secondary bleeding were operated on on the same day, and at this time the instrument, for the first time in four and one-half years, burned poorly, the instrument maker finding later that the blade had corroded and did not have uniform heat. This was possibly the real cause of the trouble. There has not been the slightest pain during operation. Only one patient has ever felt the burning, nor has there been pain after the removal of the obstruction. We cannot recall having given a hypodermic, or any sedative, to these patients except on four occasions, the pain being due in three instances to spasm from clots, and in the other to the passage of a ureteral stone into the orifice after operation.

There has been no pronounced sloughing. In fact, we have never observed a real slough. At most there have been large shreds in the urine. If one is careful in the burning, burns through at the proper time, has the field thoroughly dry, and does not boil the tissues or burn too long, sloughing will not occur. We have examined the pathologic material removed from the majority of these orifices and have been able to study the histologic detail of practically every one. In many instances even the mucous membrane has been preserved (Figs. 2 and 3). Therefore, with such tissue preservation in the part removed, we should naturally expect the same reaction to the part left behind, the burning being superficial and just enough to coagulate.

Other complications have been exceedingly rare. Epididymitis has occurred in but seven patients. In only two of them was it acute. There have been only eight patients who had postoperative chills. These all occurred in the first 100 cases. There have been no chills, fever or epididymitis in the last seventy-five operations, though many have been done on patients with badly infected bladders and kidneys.

RESULTS

In previous communications, we have taken up the immediate results with different types of orifice, and compared the frequency of urination and the type of stream before and after operation. The last twenty-five cases bear the same proportion as the previous 150, and the substance of the analysis is that there was immediate improvement in the stream with complete relief of symptoms in about two thirds of the patients within one week, and that at the end of eight weeks, 88 per cent. were completely relieved. Even in the tight contractures, 70 per cent. were cured. Some of the best results have been the ones that required as long as eight weeks after operation. This is due to the secondary edema and swelling, which are present in some of these cases. We have made it a practice to keep instruments out of the urethra. When infection is present, we occasionally give injections into the bladder and urethra under low pressure with a syringe, but under ordinary conditions do no instrumentation whatever until the sixth week, unless the patient is considerably disturbed with secondary edema and swelling, when a catheter is required, and often one or two catheterizations will abate the storm. At the end of six weeks, if the patient is doing well, he is tested for residual urine, and if the orifice was of the sclerotic contracted type, he is given dilations and treated just as if he had a stricture of the urethra, in order to keep the orifice pliable and allow it to heal with a broad base. It is also occasionally necessary to give some local treatment to the prostate and vesicles. In analyzing our cases for 1920, 1921 and 1922, in order to determine the durability and permanence of the results, it is found that, regardless of the type of orifice, more than 95 per cent. of the ones who were cured had remained so. Some of the earliest patients, operated on in 1920, have never had the slightest recurrence of trouble, and still empty their bladders completely. We have seen the majority of these patients personally, and, with very few exceptions, they have never required an instrument. Some of the contractures have had occasional dilations, but the relief from a dilation of the orifices lasts for several months, whereas, formerly, it was effective for only a few days.

There has never been the slightest incontinence following the operation, and one would not anticipate it; the mere cutting of a segment of sphincter itself would not be productive of incontinence; and the removal of the lobular ingrowths is not sufficiently deep to interfere with sphincter control. Certainly, removal by this instrument would not be expected to be productive of incontinence, if a suprapubic prostatectomy with its sphincteric manhandling does not.

Let us now call attention to the more recent development in this phase of surgery in the borderline cases; that is, those with large obstructions, many with lateral lobes or lobules, associated with fair size rectal involvements. There have been twenty cases of this type, or about 11.1 per cent.; but, as previously stated, operation has been performed in eight of these within the last six months, since we found that the results of the older patients have been so excellent. There is not a single patient in this group of twenty who would not be considered a typical prostatectomy case. For a number of these, prostatectomy had been advised by expert urologists as the only chance of cure. They have all had repeat operations, with tissue removed from practically every part of the vesical orifice. Of these twenty patients, fifteen were perfectly cured, emptied the bladder completely, and were entirely relieved of urinary disturbance. Three were not completely relieved, but were benefited at least 80 per cent. Two of the patients with large obstructions are under observation at present, and the treatment had not been completed. The entire vesical growth of one of these patients was so large that, at the first sitting, it was difficult to get the punch to grasp the neck. Nine of the patients received relief from one to three years, without the slightest return of trouble. Six of the last eight in whom the treatment has been completed are at present perfectly well, but the operations are too recent to justify the prediction of late results. The three patients with partial relief remain the same.

These cases illustrate the effect of the release of spasm and tension, with the subsidence of edema and congestion after cutting through the orifice. These are the patients in whom we are so apt to overestimate the amount of adenomatous enlargement.

CANCER OF THE PROSTATE

One of the most encouraging fields for the employment of this instrument has been in cancer of the prostate. We have used it on ten patients, most of whom were inoperable. We are all familiar with the fact that cancer of the prostate is seldom productive of large intravesical lobes. In conjunction with perineal radium and deep roentgen-ray therapy, the punch has been most valuable in giving comfort to these patients. We have had several with severe inoperable cancers of the prostate, with generalized metastasis to bones and other tissues, who were suffering frightfully with vesical tenesmus. Several patients, with complete retention, who found instrumentation almost unbearable, were immediately relieved by the punch.

It is often our impression that the whole prostatic urethra is tight and fixed in carcinoma, and that a mere incision of the orifice would seem insufficient to relieve obstruction. However, the section of the sphincteric region will almost immediately, in the majority of such conditions, relax the whole canal. The same thing applies in cases in which there are intra-urethral lobules. It simply means that the obstruction is not dependent on the amount of tissue involvement, but its location; and certainly the internal sphincter, is the most important place.

We have used the punch operation on several patients after prostatectomy with excellent results, in whom the healing was delayed by contracture.

CONCLUSIONS

It therefore seems evident that this operation is effective in removing many obstructions at the bladder neck; that in the bars and simple contractures one operation is usually sufficient; that in the more pronounced obstructions repeat operations are necessary, and that the operation is simple in execution and surprisingly free from complications such as hemorrhage, pain, slough, epididymitis and general reaction. It is attended with no mortality. The results seem as permanent as by open surgery; recontractures have never occurred after one year, and but few cases prior to that time. Its recent application in our hands to the larger obstructions, with the gratifying results obtained, seems to make it a valuable asset, not only to the bad surgical risks, but to any of these obstructions to which it can be applied.

In previous reports, it was estimated that 20 per cent. of obstructions could be relieved by this method. At the present time we feel confident that this amount can be increased to at least 30 per cent. or more, thereby reducing the number of prostatectomies, and lowering the general mortality rate of prostatic surgery.

Certainly one is not justified in doing either a suprapubic or a perineal section for the removal of the bars and contractures, and the same seems to apply to an increasing number of other obstructions.

Success of the operation depends on proper selection of cases derived by a correct interpretation of the cystoscopic picture, careful watching of the orifice and rectal involvement under drainage, patience, proper technic and thorough cooperation with the patient.

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NOTES ON A SERIES OF ONE HUNDRED AND TWENTY-ONE CONSECUTIVE PROSTATECTOMIES *

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We are all agreed today that, given a case with prostatic obstruction with a large residual urine, with or without actually acute retention, the first thing to do is to establish free drainage as quickly as possible. This should be done even though the patient has a good kidney function. An immediate prostatectomy should be reserved for the patient who not only has good kidney function, but also has a small residual urine, from 4 to 6 ounces (120 to 180 c.c.).

Whether this drainage be by means of a cystostomy or intermittent catheterization or by indwelling catheter rests with the surgeon. If the prostatectomy is to be a suprapubic one, then there is no doubt that the best method is by a suprapubic tube. This gives a chance during the period of drainage for a sinus to become walled off which, in many cases, need not be much enlarged at the final operation, especially if a half-inch tube is used. If a perineal operation is to be performed, it is much simpler to drain by catheter. There are some cases in which, I am sure, drainage is more safely done by a large suprapubic tube, whether one is going to do a perineal or a suprapubic prostatectomy. Should the patient have an overdistended bladder and show signs of renal insufficiency, dry tongue and skin, soft distention of the abdomen, and loss of appetite, he should have a cystostomy done and be drained for days, weeks or months until he is fit for the second operation. With a half-inch tube in the bladder there is no chance for the urine to back up. If the patient is drained by catheter, it may block and the bladder become overdistended again before the condition is noticed; in this way the advantage of several days' drainage may be lost. Then, too, if a catheter is used, it is not safe to empty completely a very much overdistended bladder for fear of bleeding and the catheter becoming blocked with blood clot. With a large tube in the bladder, one need not hesitate to open the bladder no matter how much it is distended.

The anesthetic used is to my mind of extreme importance. Most genito-urinary surgeons of today agree that ether is to be avoided if possible. The preliminary cystostomy is so simple and so easily done under local anesthesia that few men today use a general anesthetic In my series, a cystostomy was done eighty-four times. eighty-one times under local, and three times under spinal; none under general anesthesia. Spinal anesthesia was used for cases in which there were large bladder stones. As a rule, stones, unless they are very large, can be removed under a local anesthetic.

For the prostatectomy, I feel that spinal is the anesthesia of choice. Sacral anesthesia is undoubtedly very satisfactory, but I am free to confess that I have not tried it. Spinal anesthesia has proved to be so satisfactory that I have been loath to change. I should place the anesthetics in order of preference as follows: (1) spinal; (2) sacral; (3) local; (4) gas-oxygen; (5) ether. Ether, on account of its irritating effects on the kidney, should rarely be used for prostatectomy. In this series I used ether ten times. The patients were all men in good condition who objected to spinal anesthesia; today I should not let this influence me. One hundred and eleven operations were done under spinal anesthesia.

The advantages of spinal anesthesia are many: There is no depressing effect on the kidneys. Owing to the fall in blood pressure, there is a minimum of bleeding. Gas-oxygen has just the other effect, increasing the bleeding. If spinal anesthesia is used, it is rarely ever necessary to pack or to use a bag to control the bleeding in a suprapubic prostatectomy. If the bleeding seems to be excessive, a gauze pack can be inserted into the bladder and held firmly against the fingers in the rectum until the bleeding has been checked enough to take care of itself. As soon as the patient who has had spinal anesthesia is back in bed, he is ready to take fluid by mouth. The fact that the patient does not lose consciousness is, I think, a great help mentally in many of these men. I have seen no case in which spinal anesthesia was contraindicated. I have used it for patients with very low blood pressure and for those with very high blood pressure. In the ones with low pressure, I am apt to decrease the dose to the minimum. I have used it in very advanced cases of myocarditis. In none of my cases have I seen any serious condition following its use that could be attributed to the spinal anesthesia. Occasionally the fall in blood pressure is alarming, producing an almost imperceptible pulse and extreme pallor, but this quickly passes if the patient is left alone. For some reason, probably because the procain that we now use is purer,

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the marked fall in blood pressure is seldom seen today. Headache occasionally used to accompany spinal anesthesia, but I have seen only one such case since the war. I think these headaches have been eradicated by the very slow injection of the fluid into the spinal canal.

In this series I used packing, which was left in the bladder, in eleven cases. I feel sure that in most of these it was unnecessary, and I have not left packing in the bladder for more than two years. If the bleeding can be pretty well checked at the time of operation, a half-inch rubber tube in the bladder will take care of whatever ooze there is, and the convalescence will be much smoother. The patients in whom packing is done are apt to have a stormy convalescence; moreover, I feel that the packing adds to the danger of infection. When the packing is removed, it is apt to be followed by an annoying secondary hemorrhage caused by the opening up of the vessels that were adherent to the gauze. I do not like any foreign body, with the exception of a large tube, in the bladder following prostatectomy.

I have entirely given up the use of a catheter following a suprapubic prostatectomy. The suprapubic tube gives adequate drainage, and it is well to avoid as much as possible the urethritis that necessarily follows the use of the catheter. Some argue that the presence of the catheter is necessary to let the new urethra form around it. I think this is a fallacy. An occasional sound passed during convalescence will make sure that there is a patent urethra. The catheter may well be used for a few days after the suprapubic tube has been removed, to hasten the healing of the wound, but at the time of operation I feel that the patient is better off without it.

The type of operation used for prostatectomy should be governed by the operation with which the operator is most familiar. There is no question but that the suprapubic enucleation comes much nearer being fool proof than the perineal operation. The technic of the operation is comparatively simple and the pitfalls are few. If the obstructing prostate is entirely removed, one is pretty sure of getting a good functional result. The perineal operation, on the other hand, is attended by many dangers in the hands of the inexperienced operator. There is the danger of destroying the external sphincter, which will be followed by incontinence of urine. If one is not careful, a median lobe, which is the real offender, may be left. The rectum may be opened and found very difficult to close.

Following the perineal operation, it is not uncommon to have a temporary loss of control. As a rule, this quickly disappears. In some cases for some months after operation the patient may lose a few drops of urine on sudden exertion, such as rising quickly from a chair. This partial incontinence disappears gradually. I have had only one case of complete incontinence in which it was necessary to wear a rubber urinal. This was a man with advanced carcinoma of the prostate with complete obstruction. After the operation, the bladder emptied itself completely through the urethra, but there was absolute loss of control. This man got along very comfortably with a rubber urinal, and lived for a year after operation without any signs of obstruction.

Formerly I preferred the suprapubic route, using the perineal operation only for the small fibrous prostates and the malignant ones. I could not help being impressed with the fact that the patients after the perineal operation had an easier convalescence than those with the suprapubic operation. Even the men with advanced carcinoma giving complete obstruction did well and were usually given a long period of relief. Gradually I have come to use the perineal operation more and more, until now I elect it for all cases. Even though it may be necessary to do a preliminary cystostomy for drainage, I prefer the perineal route for the final operation. If spinal anesthesia is used, the bleeding as a rule is very slight, and it is not necessary to pack the wound. Two pieces of rubber tissue alongside the perineal tube to the prostate cavity is all that is necessary. The operation I use is the one perfected and used by Young. The preliminary drainage is done by catheter except in the cases I have mentioned; when there is long standing back pressure, I feel that suprapubic drainage is safer. The time picked for the final operation is determined entirely by the patient's general condition and by the kidney function.

There has been a good deal of controversy over the advisability of making a preliminary cystoscopic examination in all cases. I agree entirely with Dr. Rathbun that it should not be done as a routine. It is all very well in the men with a small residual urine who are in good shape. I make cystoscopic examination in all these men. It is those with a large residual urine and symptoms of backpressure that I feel should not be subjected to cystoscopy at once. The one thing of prime importance in these men is the relief of backpressure and the restoring of the kidney function, and this should be done in the simplest possible way. The traumatism of a preliminary cystoscopy may stir up an infection that will be just enough to turn the tide in the wrong direction. Many of my patients with enlarged prostates are not examined cystoscopically until they have had spinal anesthesia for the operation. If the cystoscope reveals large stones or growth or a diverticulum, I do not hesitate to go in suprapubically instead of through the perineum. If there should be a diverticulum or growth that needs removal, this can be done and the prostate removed later.

In my series of 121 prostatectomies, there were twenty, or 16.6 per cent., that were malignant. The percentage is probably a little higher than this as, I am sure, the pathologist does not always find malignancy in the prostate that shows early malignancy. I remember one man I saw, a little over a year after a suprapubic prostatectomy, who showed nodules of new growth about the bladder outlet which I am certain originated in the prostate. According to the pathologic report it was benign, but my notes stated that the prostate was very adherent and difficult to remove.

In the 121 cases there were four deaths, or 3.3 per cent. These four deaths following operation were all in cases in which there were benign prostates. In looking back over these fatal cases there is only one that I feel I should not have lost, and in that case I cannot yet be sure where the error in technic was. Three deaths followed the suprapubic operation and one the perineal.

The case I regret most and in which I still fail to understand the error, as error it must have been, was of a man, aged 71, in good general condition. Four weeks before I saw him, he had been operated on under ether for a right inguinal hernia. During his convalescence he had great difficulty in voiding and continued fever in spite of the fact that the incision had healed nicely. He was finally discharged home still with a fever. At the time I saw him, he had a temperature of 105 F. The prostate was very large and elastic. There was no suggestion of malignancy. He had a residual urine of only 6 ounces (180 c.c.), but that was almost entirely thick pus. I sent him to the hospital at once

and opened the bladder, under procain. Under suprapubic drainage, the temperature at once fell and the patient improved rapidly. At the end of two weeks he was in excellent condition and, under spinal anesthesia, I did a very easy suprapubic enucleation of the prostate. During the operation there was only one slip that I could see might have any effect on the final outcome. That was, after the prostate was free, a right-angled bladder retractor was put in hastily and slipped down outside the bladder instead of into the bladder. This was at once rectified and not thought of until afterward. Following the prostatectomy, the patient did very badly. He became distended and had persistent nausea and vomiting. He drained very little urine. On the day after the operation, material appeared on the dressing that looked like the contents of the small bowel. On the third day after operation, the patient died with all the symptoms of a general peritonitis. Postmortem examination showed a tear in the peritoneum connecting it to the wound. There was a gangrenous piece of ileum, which was perforated adherent to the opening in the peritoneum. What happened I do not know. I have never heard of a similar case. What I do feel sure of is that, had I elected the perineal route for the final operation, I would never have lost him.

The second patient was a man, aged 68, on whom I did a two stage suprapubic prostatectomy. At no time during the early stage did he give me any concern. He was in excellent condition. The kidneys were functioning well. After the prostatectomy, the suprapubic tube was removed on the third day and a catheter inserted. He was up and walking around each day. On the tenth day after prostatectomy he had a chill, and came down with a frank right lobar pneumonia involving the whole right lung. He died two days later. I see no way in which this could have been foreseen or avoided.

The third death was of a man, aged 71, who had been in very poor health for several years. He had a very bad myocarditis, which had been decompensated several times. He had acute retention first nine years before. During the last two years he had had several attacks of retention, and catheterization was becoming more and more difficult all the time. Although the man was a very poor risk, it seemed wise to do a cystotomy to assure complete drainage of the urine and to avoid the discomforts and dangers of the catheter. It was thought possible that the prostatectomy could never be risked. After a long period of drainage, the man was improved so much that it was decided to risk the prostatectomy. A very large prostate was removed suprapubically without difficulty. On the second day after operation, he showed signs of renal insufficiency, dry tongue and distention, and was given hypodermoclysis several times. He responded well, and began to excrete a satisfactory amount of urine. On the tenth day he was draining well by catheter, when he developed a very severe epididymitis with high fever. This was just enough to turn the tide against him. His heart became decompensated, and he developed general edema and suppression of urine and died. Perhaps if I had not drained him by catheter he would not have developed the epididymitis and might have pulled through.

The fourth patient was a man, aged 76, who was very corpulent. He had a large, benign, completely obstructing prostate. He was drained two weeks by catheter and was in excellent condition. The kidneys functioned well. I did a perineal prostatectomy on him, under spinal anesthesia, which he stood very well. He made a very uneventful convalescence up to the seventh day, when he had a complete left hemiplegia. Following this he rapidly failed, and died in nine days. The kidneys excreted well up to the end.

I have noted some of the more important complications occurring before and after operation.

Diverticula of the bladder occurred in four cases. In two, I removed the diverticulum at the same time the prostate was removed. If a diverticulum is very large, I think it better to remove it at a separate sitting. As a rule, it is too much of an operation to combine with a prostatectomy.

I included under complications the cases in which packing was done for excessive bleeding. This was done in eleven cases, all suprapubic prostatectomies. Most of these were patients that were etherized. I am very sure that today I would not pack so many. As I mentioned before, with a patient under spinal anesthesia, bimanual pressure can be exerted until the bleeding is checked sufficiently so that it is safe to insert a large drainage tube.

Vesical calculi occurred in nine cases. In three cases, spinal anesthesia was used. In the others, the stones were removed when the cystostomy was done under local anesthesia.

Observations in One Hundred and Twenty-One Cases

	Number
Benign	101
Age:	
Youngest	48
Oldest	90
Average	68
Suprapubic prostatectomy	79
Two stage	73
One stage	6
In hospital:	
Shortest	14 days
Longest	80 days
Average	34 days
Deaths:	
1 right lobar pneumonia on tenth day after prostatectomy	
2 general peritonitis on third day after prostatectomy	
3 myocarditis, epididymitis on tenth day, general edema and death	
Perineal prostatectomy	22
One stage	21
Two stage	1
In hospital:	
Shortest	14 days
Longest	67 days
Average	30 days
Deaths: 1 hemiplegia on seventh day, death nine days after	
Malignant	20
Age:	
Youngest	59
Oldest	79
Average	67
Suprapubic prostatectomy	5
Two stage	5
One stage	0
In hospital:	
Shortest	23 days
Longest	48 days
Average	35 days
Perineal prostatectomy	15
One stage	10
Two stage	5
In hospital:	
Shortest	12 days
Longest	100 days
Average	38 days
Deaths	0
Anesthetic (both benign and malignant):	
Cystostomy:	
Ether	0
Local	81
Spinal	3
Prostatectomy:	
Ether	10
Spinal	111
Complications:	
Diverticula	4
Packed	11
Hernia in scar	3
Vesical calculi	9
Papilloma	1
Strangulated hernia	1
Secondary hemorrhage	1
Stricture of urethra	2
Recto-urethral fistula	1
Incontinence of urine	1

There was one case of papilloma of the bladder. This was not very large, and resection was done at the time the prostate was removed suprapubically.

Hernia in the suprapubic scar occurred in three cases. Two of these were repaired under spinal anesthesia; in the other, a case of advanced carcinoma of the prostate, the patient was fitted to a belt. I rather wish I had repaired it, too, as the patient is in apparently perfect health at the end of two years.

There was one patient who developed a strangulated inguinal hernia five days after a suprapubic prostatectomy. This was operated on, under spinal anesthesia, by Dr. George F. Keenan, with a perfect result.

There was only one secondary hemorrhage requiring attention. This followed a perineal prostatectomy. The man was very nervous, and strained a great deal. There was considerable oozing, so that I opened the wound and packed. There was no trouble after this.

Two patients on whom I did a suprapubic prostatectomy had tight posterior strictures as well as prostatic obstruction. One I was able to dilate with a LaForte sound, and the other was so tight that I was obliged to do an external urethrotomy.

There was one case of recto-urethral fistula which I have mentioned previously. The rectum was opened while a perineal prostatectomy was being done. It was closed at the time of operation, but broke down. It required two later operations to close it. The patient still thinks that he passes a little urine into the rectum. The bladder in this case never became infected.

There was one case of complete incontinence of urine following the removal of a large carcinomatous prostate.

The series that I present is not large, but may bring out some points useful to others.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. DAVIS, CAULK AND SANFORD, AND CROSBIE

Dr. Bransford Lewis, St. Louis: These papers show apparently a renaissance of the more conservative methods, and a trend back to the perineal method of prostatectomy. That was one of the central ideas presented, and the other was the use of some form of local anesthesia instead of the general, through the spinal or sacral anesthesia, and the discussion by Dr. Caulk of a more simple method of attacking with the punch. I have used these several methods. After using both the suprapubic and the perineal method of attack for removal of the prostate, I should say that the criticisms of Dr. Crosbie represent my ideas of the two methods. I think the discussion should not hinge on the ease or difficulty of removing the prostate by one or the other method. I think the surgeon should be fitted to do either one or the other, as may be demanded by the individual case. Judging in that way, I have preferred the suprapubic route, not because it is fool proof or easier to do, but because the final result is better by that route. I have had the complication in the perineal removal of weakening of the sphincters, with the pressing out of a few drops of urine on getting up or sitting down suddenly, and also the urethrorectal fistula, that came on after seven days, when the patient had been in good condition and convalescing nicely. Dr. Young has removed that danger to a large extent by insisting on the sewing together of the levator ani muscle, and yet these cases turn up once in a while following the perineal operation. I base my conclusion on the after-result rather than the ease of carrying out one or the other procedure. I was much interested in Dr. Lowsley's method of using preliminary suprapubic drainage and then removing the prostate by the perineal route. I saw him do this the other day, and I did not see the need of the two operations, one suprapubic and the other perineal, for the removal of the gland. I still believe it is better to do the suprapubic under infiltration anesthesia, using that for drainage, and then go into the same wound, without an additional one in the perineum, and remove the prostate. With reference to the anesthesia, I am glad to see the tendency to get away frim general anesthesia, no matter what form is used for prostatectomy. My own experience has not been favorable. When the spinal anesthesia is good it is ideal, but when it is not good it is fatal, and that happens too many times. Therefore, I think the preference should go to the sacral anesthesia with no mortality rather than to the spinal with the high mortality. Dr. Caulk's method is admirable, conservative, and certainly has a place in surgery for the bar and contracted cases. He is attacking in one way and I have attacked by the electro-incisor through the cystoscope. Either one is good, and the results obtained are good in cases that are suitable for them. They should not be used in cases that are inappropriate for either method.

Dr. Louis E. Schmidt, Chicago: Dr. Caulk refers to borderline cases. Accurate diagnosis is necessary to determine the advisability of operating according to the method of Young —with the punch instrument. One of the speakers referred to the indiscriminate use of the cystoscope. In all cases in which the punch operation is to be carried out, careful cystoscopic examination must be made before as well as after the operation. On general principles, also in view of the accidents which may take place at the time of operation or afterward, I object to placing this operation into the category of so-called office operations. One can make no mistake by performing this operation at hospitals. As regards anesthesia, there can be no question that in the hands of those who are qualified, perfect anesthesia for perineal operations is attained by both the epidural and the parasacral methods. I prefer the former, and have seen no untoward results from either method; however, failures occur in both. The intraspinal method, unquestionably, if given sufficiently high, gives perfect anesthesia; but I maintain that there may be alarming sequelae. As to my own statistics, I believe that, all in all, the sacral methods are safer, and in conjunction with infiltration anesthesia, when suprapubic work is done, that it is the method of choice. Still, it must be mentioned that gas-oxygen and gas, oxygen and ether or ethylene gas cannot be discarded. I find sufficient indication to use each and every method mentioned, and hence do not find it necessary to state that one should employ only one method of anesthesia in every case. Finally, I was pleased to hear Dr. Crosbie again take up the angle of perineal and suprapubic prostatectomy. With the use of sacral and other anesthesias and reviewing the accidents and the results of all our twenty-five years' work, I can state that I am now again doing some perineal prostatectomies, which at one time of my experience I would have done by the suprapubic route. I agree with most of the statements made by Dr. Crosbie, even if he has not passed through all the periods through which the operation of prostatectomy has passed in the last quarter of a century.

Dr. Parker Syms, New York: The question today, in prostatectomy, has resolved itself into a more systematic study of those factors which lessen the danger to the patient, giving due consideration to his immediate convalescence and his ultimate recovery. One of the greatest added factors in the safety of these surgical measures is found in sacral anesthesia. I have been doing all of my perineal and rectal surgery under sacral anesthesia since 1918. I have found it very satisfactory. In a series of cases of hemorrhoidectomies, of sufficient number to give an estimate, I was able by the simple caudal injection to have anesthesia in more than 95 per cent. of the cases. The procedure is a safe one, and there will be no accidents if it is properly performed. I agree that spinal anesthesia is too dangerous for promiscuous use. I cannot understand why one would resort to immediate drainage of the bladder in a case in which he would hesitate to perform a one-stage operation. If we suddenly empty an overdistended bladder, we subject the patient to all the risk that would be encountered by a one-stage prostatectomy. In these cases, the back pressure should be relieved gradually. If repeated catheterization is too difficult or impossible, an indwelling catheter may be used, as proposed by Young. If more than this is needed, an external perineal urethrotomy should be performed. This can be done under local anesthesia in one or two minutes. A self-retaining catheter may be used, and the withdrawal of urine may be made gradually. We always have the bladder sphincter to fall back on in case we want to reestablish intravesical pressure. This is something that can never be accomplished in suprapubic drainage. Twenty-four years ago, I described my method of perineal prostatectomy. At that time I showed an inflatable rubber bag, attached to a stem, which could be introduced into the bladder and then distended with water. This made a most excellent form of retractor. It was soft enough to accommodate itself to the interior of the bladder. This is a great aid

and reduced hemorrhage at the time of operation; but I have never had occasion to use it after an operation. With careful dissection of the prostate, removing the lobes from within the sheath, in the proper line of cleavage, we have little or nothing to fear from hemorrhage.

DR. OTTO J. WILHELMI, St. Louis: I particularly enjoyed Dr. Caulk's paper on account of my association with Barnes Hospital and clinic, where I have seen the procedure so often, and because I have used it myself. I think the results are largely dependent on the selection of the case. When there are enlarged lateral lobes, I think it is better not to use the punch. On the other hand, when there is a large median lobe or a collar process, I think the punch works very successfully. There are several arguments regarding the operation. In its behalf it might be said that it is a rapid procedure, a painless procedure, and a procedure that has no postoperative skin wound that has to heal later. However, there are a few things that might be said against it. One is the postoperative hemorrhage that occurs in some of these cases. This might be due to the heat of the blade at the time it is driven home. If the blade is not warm enough and the area is torn, there is more apt to be a postoperative hemorrhage than if there is complete cauterization. Another thing against the operation is the postoperative epididymitis, which very frequently occurs. Epididymitis also occurs quite frequently with general prostatectomy, however, so we cannot lay this to the punch operation alone.

DR. HUGH H. YOUNG, Baltimore: I am particularly interested in epidural anesthesia with procain. Many years ago, when working in Paris at the Hôpital Necker, I saw the early cases of Cathlin, who was the first to employ epidural injections. The cases in which they were used were those of incontinence, and salt solution was injected. Returning home, I used the method in many cases but never thought to use it for anesthesia, and it was many years later that an anesthetic injection was used. Several years ago, we began using epidural injections of procain in conjunction with parasacral nerve injections. We found the method very tedious and unsatisfactory. At the suggestion of Dr. Davis, during the last six months we have simply used epidural injections, and the results obtained have been remarkably fine. We use from 30 to 50 c.c. of a 2 per cent. solution of procain. The needle does not enter the spinal canal, and the fluid injected through the sacral notch is entirely extradural. The method, therefore, is much simpler and safer than spinal anesthesia, and gives perfect results in practically all cases of surgery on the perineum. We have now done about thirty perineal prostatectomies, several radical excisions of tuberculous seminal vesicles and prostate, and one radical excision of a carcinoma of the prostate with the neck of the bladder and the seminal vesicles. In these very extensive operations, it is only necessary to inject procain locally when the upper portion of the seminal vesicles and the vasa deferentia are attacked. The nerve supply to these structures comes from a region higher up and is not reached by epidural injections; but by means of local infiltration along the vas and in the spermatic cord in the groin, epididymectomy can be carried out after seminal vesiculectomy without general anesthesia with perfect success. The method is not satisfactory for suprapubic anesthesia. The simplicity of epidural anesthesia is such that it offers another reason for the employment of perineal instead of suprapubic prostatectomy. I am also interested in Dr. Davis' rubber bulb for arresting hemorrhage after perineal prostatectomy. There is undoubtedly considerable objection to the use of gauze packing and I have tried several types of rubber bulb apparatus, but nothing so simple or satisfactory as this of Dr. Davis. Dr. Caulk's report on the results of his punch operations is, also, most interesting. It is now fifteen years since I did the first punch operation, and the results obtained in proper cases have been just as satisfactory as prostatectomy. The simple punch which I first introduced does occasionally give troublesome hemorrhage. An instrument that I have used now for fourteen years is provided with an irrigating tube. Dr. Caulk's apparatus is a simple instrument, and it is evident from his report that his results are very satisfactory. My experience in the use of the punch in cases of hypertrophy has not been quite so good as his, and I am inclined to favor the operation for fibrous contractures of the vesical orifice and median bars. I have also found a certain number of cases in which the anterior margin of the prostate is enlarged in the shape of a bar or valve and have removed it with my punch.

DR. B. A. THOMAS, Philadelphia: It has been very gratifying to me the last few years to see that considerably more discretion is exercised with respect to the perineal and suprapubic routes in prostatectomy. As long as twelve years ago, I was much impressed with the fact that there seemed to be two schools of prostatectomies, one that was wedded to the perineal and the other to the suprapubic route. To me that stand appeared to be fundamentally and inherently wrong, and I attempted to point out in 1914, before the American Urological Association, that there should be greater consideration given the fitness of the patient for either the one or the other of these operations. As stated then, and I repeat now, the surgeon should stand ready and prepared at all times, on the evidence furnished by a painstaking examination in the individual case, to do either operation, as indicated by the pathologic condition present, and not as a routine, to subject the patient to the only operative route in which he has been trained, or that suits his preference or professional reputation. As to anesthesia, the majority of patients who die do not die as the result of the anesthetic administered. I feel that if the patient is properly qualified for the operation, the choice of anesthetic is not a matter of great importance. They will do better under ether, if the kidney function and cardiovascular condition is good, than they will do under gas or caudal anesthesia, if these are neglected or ignored. I believe that the best anesthetic in all cases is a general one, consisting of nitrous oxid and ether. There are a few cases unquestionably as there always have been and will be, in which another form of anesthesia, whether it be spinal, caudal, transsacral, scopolamin-morphin or local, should be used. Certainly, today, caudal and transsacral presumably takes precedence over spinal anesthesia and should be utilized in a certain limited number of cases. We had one very serious case of shock from the use of caudal and transsacral anesthesia. The patient did not die, but his condition was serious. It is possible to puncture the dura in undertaking caudal anesthesia, which act is characterized by the flow of spinal fluid. Although the needle was withdrawn a centimeter or more after the flow ceased and only 30 c.c. of a 1 per cent. procain solution was injected, the patient promptly went into severe and desperate shock, and it required almost a week to keep him on earth. He retained the prostate. In the future I shall not inject the anesthetic, or proceed with the operation on the day the dura has been inadvertently punctured. I think Dr. Caulk's punch operation is very commendable. Prior to the advent of his cautery punch I used Young's punch, which in my hands has done more effective work, and which today I prefer. I believe the safest punch operation is that combined with cystotomy, whereby more thorough work can be done with greater safety.

DR. H. J. SCHERCK, St. Louis: After listening to these papers on prostatectomy, and having in past years heard a great many others, my opinion has been confirmed more than ever that there is more to be considered in statistics than one would think of by listening to the papers of the master urologists of the country, who differ in detail as to technic and as to anesthesia; yet the specialists report about the same mortality notwithstanding their different methods. Statistics of true mortality in all cases are perhaps higher in prostatectomy than most major procedures. If the master surgeons and urologists have a mortality ranging from 2 to 6 per cent., and yet the general mortality runs to 35 per cent., there must be a reason. That difference is not in the technic of the good surgeon or his method of anesthesia, but in the care of the patient before and after operation and poor surgery by men not properly trained. Those two points spell lower mortality. There is no question whatever, and I have seen the best urologists in this country operate and have heard them talk, and have seen the various methods used by these men; their end-results are practically the same. The care of the patient before and after the operation, the meeting of indications, and general surgical technic are unquestionably

the most important items of this question. Our interest in this operation should go further than our specialty, and we should reach the general surgeon and lower the mortality as it affects the human being generally who is the subject of poor surgery. Our interest should extend to the general surgeon and the general practitioner who attempts this operation, and teach him, concerning the question of anesthesia, that ether is excellent and safe. The local methods are, of course, to be commended, and I think that caudal anesthesia has certain advantages if we are going to use a local method; yet there are many cases in which the caudal method is not successful in producing satisfactory anesthesia. The drop ether anesthesia in the hands of one who is careful has in my experience never seemed to produce any distressing effects. The question of opening the bladder in order to do a punch operation seems to be unnecessary, for if one is going to open the bladder suprapubically one might as well do a suprapubic operation for many reasons. I have admired the enthusiasm of Dr. Caulk and Dr. Young with regard to their work with the punch. At the same time, if Dr. Caulk has done about 150 operations, including, as he says, some which have gone beyond the borderline, how has he taken care of the 15 to 20 per cent. of the potentially malignant cases that could have been discovered only by a suprapubic examination? Did they ultimately terminate in malignancy? He certainly does not obtain a specimen sufficient for pathologic examination, in most cases with the punch method, even if a piece of tissue is removed. We all know that the prostate is a very deceiving organ so far as malignancy is concerned, for we may find malignancy in a part of it not suspected.

Dr. Leon Herman, Philadelphia: Dr. Crosbie has been brave enough to open the question of prostatectomy by the two routes, and I have no issue to take with either one. I am more interested in the effect of instrumentation in cases of back pressure on the kidneys. In a paper from the Mayo Clinic it has been shown that that which we call toxemia is largely the result of congestion, or of infection which lights up following instrumental procedure. This follows any form of instrumentation on the urethra. In patients with normal kidneys, this is difficult to demonstrate, but in prostatic patients the diminution in renal function following cystoscopy can be readily measured. We have a patient who entered the hospital with 5.2 mg. of creatinin and a blood urea of 85 mg.; within forty-eight hours after the introduction of an indwelling catheter, the creatinin had increased to 6.2 mg., and the blood urea was 115 mg. The patient recovered from the uremia, wore the catheter for six weeks, and again had a stormy time following cystostomy, although in the meantime the blood chemistry had improved. The second point is that in very old and very weak patients who come to the hospital with distended bladders, the renal destruction is usually in direct proportion to the length of time that the obstruction has existed. In patients with sudden, acute retention who have had few symptoms antedating the retention, the dangers of instrumentation are small. In the former type of case, we believe that the introduction of the indwelling catheter is quite as dangerous as suprapubic cystostomy. In cases of acute retention in which unsuccessful attempts at catherization have been made, giving rise to considerable hemorrhage, we do immediate drainage under local anesthesia. This method is safer, I believe, than further attempts at catheterization. We have had some difficulty in the prevention of injuries to the peritoneum during the second stage of the two stage prostatectomy, and during the last year have torn in through the peritoneum during the enucleation of the prostate in five cases. There seems to be no way to prevent this except by making a wide dissection, which is not advisable in all cases. The danger of peritonitis is small if the peritoneum is sutured carefully to the posterior bladder wall immediately after the accident is discovered.

Dr. Herman L. Kretschmer, Chicago: There seems to be a notion that it is not necessary to perform cystoscopic examinations in patients suffering with prostatic hypertrophy, and also that it is not safe to examine these patients with the cystoscope. I believe that we, as a section, should not countenance that general impression. It appears to me, as was brought out by Dr. Caulk, that it is both necessary and desirable to study these cases as accurately and as thoroughly as possible before operation, and I know of no way of doing this except by means of the cystoscope.

Dr. Edwin Davis, Omaha: Sacral anesthesia in urology is not a new method. It is several years old in America. As long ago as 1915, M. L. Harris referred to this method. In 1916, Lewis published a report of eighty cases, fourteen of which were suprapubic prostatectomies, and there are others in this audience who have aided in developing this method. Suprapubic prostatectomy, with the aid of infiltration anesthesia of the abdominal wall, has been done over a considerable period of time, and I believe we should not allow this occasion to pass without giving proper credit to those to whom credit is due.

Dr. John R. Caulk, St. Louis: I wish to pay my respects to sacral anesthesia. I started its use in 1915, after Lewis had brought out its value, and have found it very satisfactory, particularly in cystoscopy of the tuberculous bladder. Sacral anesthesia during a punch operation does not work well. It gives sometimes too much relaxation to get a good grasp with the instrument. In some cases of cancer it works well. As far as hemorrhage and epididymitis are concerned, we have had only seven cases of epididymitis and have had none at all in the last seventy-five cases. We have had no active hemorrhage except in the three cases I have cited, two late and one primary, due to faulty instrumentation. If the case is properly selected there should be no hemorrhage. Dr. Young and I have no controversy about the punch. I have given him credit for developing this phase of surgery. I simply put a cautery point on the punch he advised, the object being to stop all bleeding, if possible. I do not diagnose my cancers as does Dr. Scherck, and while I think the punch operation will often give one cancer tissue, I do not feel that this is of importance. I feel that it is necessary to do a cystoscopic examination of every case. In our cases we find a large percentage of stones and diverticula, and many cases due to nerve lesions when the diagnosis can be made only by means of the cystoscope. In many instances perineal prostatectomy has been blamed for postoperative incontinence when a central nerve lesion was the real cause of the trouble. I have no fear of doing a cystoscopic examination. It is not pleasant, but I pay no more attention to it than to passing a catheter. I do not see any reason for making a big job of it, and I intend to do it on every patient before I open the bladder.

TABES DIABETICA *

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Tabes diabetica, which is briefly mentioned in many textbooks of medicine,[1] is apparently a very unusual condition. Other neurologic manifestations of diabetes mellitus are fairly common, and the literature on the different types of diabetic neuritis is fairly extensive. The work of Williamson,[2] Bruns,[3] Kaiser,[4] Fraser,[5] and others has called attention to the very interesting neurologic complications that may occur in diabetes.

Williamson describes eight different clinical pictures due to peripheral neuritis or to spinal lesions in diabetes.

* From the Department of Internal Medicine University of Kansas School of Medicine.

1. Osler, William; and McCrae, Thomas: The Principles and Practice of Medicine, 1920, p. 429. Stevens, A. A.: The Practice of Medicine, 1922, p. 368. Strümpell, Adolf: Spezielle Pathologie und Therapie 2: 225, 1912.

2. Williamson, R. T.: On the Knee Jerks in Diabetes Mellitus, Lancet 2: 138, 1897; The Symptoms Due to Peripheral Neuritis or Spinal Lesions in Diabetes Mellitus, Rev. Neurol. & Psychiat. 5: 950, 1907; Note on the Tendo Achillis Jerk and Other Reflexes in Diabetes Mellitus, ibid. 1: 667, 1903.

3. Bruns, L.: Ueber Neuritis diabetica und alcoholo-diabetica, Deutsch. Ztschr. f. Nervenh. 30: 509, 1908; Ueber neuritische Lähmungen beim Diabetes mellitus, Berl. klin. Wchnschr. 27: 509, 1890.

4. Kaiser: Isolierte Trochlearislähmung beim Diabetes mellitus, Ztschr. f. d. ges. Neurol. u. Psychiat. 16: 217, 1913.

5. Fraser, T. R.: On a Case of Diabetic Neuritis, with a Description of the Postmortem Examination of the Nerves and Muscles, Edinburg M. J. 40: 300, 1896.

Among these he mentions pseudotabes, of which, he states, a few cases have been recorded. Von Noorden [6] saw three cases of "pseudotabes," and Head,[7] has described a case of "so-called diabetic tabes." The work of Sandmeyer [8] and Williamson [9] has shown that in diabetes mellitus a degeneration of the posterior columns may occur, which resembles very much the lesions found in tabes dorsalis. The demonstration of such spinal cord lesions would justify the application of the name tabes diabetica to this condition.

In the case reported here, the patient was studied with much interest because of the rarity of this condition, and also because of the initial difficulty in determining whether this patient had diabetes mellitus, complicated by tabes dorsalis, or whether he had tabes diabetica.

REPORT OF CASE

A farmer, aged 50, was admitted to the Bell Memorial Hospital, April 25, 1924, with the diagnosis of diabetes. The family history was negative. There was no history of diabetes or nervous disorders. The personal history was essentially negative. There was no history of gonorrhea or syphilis. The present illness started in 1918, with a marked thirst, increase in appetite and polyuria. The patient consulted a physician at that time. A diagnosis of diabetes mellitus was made, and he was placed on a diabetic diet.

Two years ago, the patient became unsteady in his gait and lost control of his legs, when walking in the dark or walking down stairs. He also noted, at times, a tingling of the arms and legs and sharp lightning pains in the legs. He suffered almost complete loss of sexual power, became very irritable, and was subject to attacks of mental depression.

The patient was well nourished. The eyes showed no exophthalmos. The movement of the eyes was good. The pupils were equal and reacted very sluggishly to light. The reaction to accommodation was more active. The ears and nose were normal. The mouth was normal and the teeth were in good condition. There was no general glandular enlargement. The chest was clear on percussion and auscultation. The heart was of normal size, and the heart sounds were clear. The blood pressure was 140 systolic and 60 diastolic.

The neurologic examination of this patient was of considerable interest. The knee kicks were slightly exaggerated on both sides. There was no ankle clonus. Westphal's sign was negative. The patient was extremely ataxic, and could not walk alone. There was a markedly positive Romberg sign. When the patient stood with his feet together and his eyes closed, it was necessary to hold him to prevent his falling to the floor.

The sensory examination showed areas over the chest, abdomen, thighs, shoulders and back, tips of the fingers and soles of the feet which had a diminished sensation to touch and to pain.

The patient's blood sugar, on admission, was 384 mg. in 100 c.c., and the carbon dioxid tension 58 per cent. by volume (Van Slyke). Examination of the blood showed 4,900,000 red blood corpuscles and 9,450 white blood corpuscles, and hemoglobin 90 per cent. (Sahli). The blood Wassermann reaction was negative. The urine, on admission, showed a specific gravity of 1.025; it was negative for albumin and strongly positive for sugar. A lumbar puncture was carried out, April 30, and the fluid was under 300 mm. pressure. The fluid showed a cell count of 2; the Pandy test was slightly positive; the Wassermann reaction, negative.

The patient, on admission, was placed on a diet of 25 gm. of carbohydrates, 50 gm. of protein and 75 gm. of fat, and was given insulin in 10 unit doses daily. The diet was gradually raised to 50 gm. of carbohydrates, 100 gm. of protein and 150 gm. of fat. He was discharged from the hospital, May 10, much improved, although still somewhat ataxic and still showing some sensory disturbances.

The patient was seen on three occasions after his discharge from the hospital, and the first two times showed a marked improvement in the neurologic condition. The third examination, June 14, 1924, showed that the patient's ataxia had completely disappeared. The pupillary reactions were more active, he was able to walk normally, and the sensory examination showed no abnormalities over the skin. Since his discharge from the hospital he has been following his diet, taking from 15 to 30 units of insulin daily, and is sugar free and in good condition.

COMMENT

This patient is evidently a typical example of the complication often referred to as pseudotabes, or tabes diabetica. He showed an extreme ataxia, a tabetic gait and marked sensory disturbances, together with sharp shooting pains in the legs. The pupillary reactions were not typical of tabes dorsalis, although there was a sluggish response to light. The knee kicks were exaggerated. A very striking feature was a marked improvement with dietary restriction and insulin therapy. It is rather difficult to believe that the patient could have had so much degeneration of the posterior columns as described by Williamson and Sandmeyer and have recovered so promptly from his tabes-like symptoms.

6. Von Noorden, Carl: Die Zuckerkrankheit, 1912, p. 235.
7. Head, Douglas: A Case of Diabetes Mellitus with Multiple Neuritis, So-Called Diabetic Tabes, Northwest Lancet **24**: 447, 1904.
8. Sandmeyer, Wilhelm: Beitrag zur pathologischen Anatomie des Diabetes mellitus, Deutsch. Arch. f. klin. Med. **50**: 381, 1892.
9. Williamson, R. T.: Changes in the Posterior Column of the Spinal Cord in Diabetes Mellitus, Brit. M. J. **1**: 398, 1894; Changes in Spinal Cord in Diabetes Mellitus, ibid., 1904, p. 122.

SECRETION OF BACTERICIDAL URINE AND DISINFECTION OF THE URINARY TRACT

FOLLOWING ORAL ADMINISTRATION OF CERTAIN ALKYL DERIVATIVES OF RESORCINOL *

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The urgent need of an efficient internal urinary antiseptic is fairly measured, not only by the extensive researches which this need has stimulated, but somewhat more strikingly by the universal use of the more or less complicated procedures involving instrumentation of the bladder and ureters for the purpose of applying bactericidal substances to the mucosa of the urinary tract. Even when applicable, these methods, requiring special skill and always attended with considerable discomfort to the patient, would obviously be minimized were any substance known which, administered internally, would impart to the urine either bactericidal or bacteriostatic properties of sufficient strength and continuity to effect equally good or better clinical results.

Hexamethylenamin and the many closely allied compounds which have been exploited to the medical profession under various names were thought for a time to be promising, not only as urinary antiseptics but as general internal antiseptics as well. This hope was raised by their identification in practically every body fluid by Crowe,[1] Hinman [2] and others. It remained for

* From the Department of Bacteriology of the School of Hygiene and Public Health, Johns Hopkins University.
* Read before the Section on Pharmacology and Therapeutics at the Seventy-Fifth Annual Session of the American Medical Association, Chicago, June, 1924.
* Because of lack of space, this article is abbreviated in THE JOURNAL by the omission of case reports. The complete article appears in the Transactions of the Section and in the author's reprints.

1. Crowe, S. J.: Bull. Johns Hopkins Hosp. **19**: 109, 1908; **20**: 103, 1909.
2. Hinman, Frank: The Value of Hexamethylenamin as an Internal Antiseptic in Other Fluids of the Body Than Urine, Arch. Int. Med. **13**: 841 (June) 1914.

Hinman [3] to point out the reasons for the complete failure of these substances as internal antiseptics, and to explain their very limited usefulness as urinary antiseptics.

Owing to the time element necessary for the decomposition of these substances in acid urine as much as to the necessity of an acid reaction, large groups of urologic patients are at once excluded from any possible chance of benefit from their use. Among these may be mentioned all patients with infections of the pelvis of the kidney or incontinence of urine from any cause. In neither of these groups does the urine remain in contact with the infected area for a sufficient time to allow the decomposition of the drug, and certainly not for a sufficient time to allow the formaldehyd released to reach the concentration necessary to exert an appreciable bactericidal action. On the other hand, it is common clinical experience that even when all conditions seem ideal, these substances exert little if any influence on the course of urinary tract infections in therapeutic doses, for the reason that the concentration of formaldehyd necessary to disinfect is extremely irritating to the inflamed urinary mucosa.

The admirable investigations conducted in Dr. Hugh Young's clinic at the Johns Hopkins Hospital by Davis, White and their co-workers [4] in the field of urinary antisepsis has led them to enumerate five qualifications for the ideal urinary antiseptic, as follows:

1. It should be chemically stable.
2. It should be nontoxic.
3. It should be nonirritating to the urinary tract.
4. It should exert an antiseptic action in high dilution in urine of any reaction.
5. It should be eliminated in high percentage by the kidney.

Their investigations included over 400 compounds, many of which were synthesized for the purpose, among these being a number of sulphonephthalein and xanthone derivatives, which were given intravenously and excreted by the kidneys to the extent of from 60 to 70 per cent. in one hour.

As extremely rapid elimination of each dose might result in a very transient local action in the urinary tract, and also as the necessity for intravenous administration at once limits the clinical usefulness of a drug, I would modify Davis' fifth qualification and add a sixth:

5. It should be eliminated in the urine in sufficient concentration to exert a local antiseptic action and at a rate by which *continuous* antiseptic action may be attained.
6. It should be administrable by mouth.

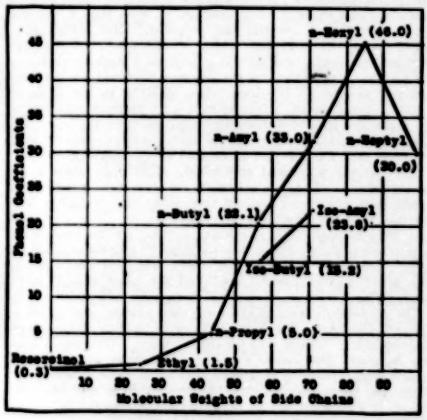
The term "nontoxic" requires qualification. It has such widely different meanings to the toxicologist, the physiologist and the clinician and includes so many factors that "the idea poison cannot be circumscribed and consequently its definition is impracticable." [5] Kobert lists sodium chlorid as a poison. Wherever used in this paper the term "nontoxic" is employed in the usual clinical sense; i. e., *in the doses described and in the manner administered* there is no discoverable impairment or destruction of function (Blyth) seriously affecting health (Hains, Taylor, and others). Davis' second qualification, in practical application, is therefore understood to mean nontoxic *in therapeutic doses.*

ALKYL RESORCINOLS

It is my purpose in this paper to describe briefly a series of unique phenolic substances which appear to meet the experimental qualifications mentioned above, and to give in more detail the results obtained with the most promising member.

In 1913, Treat B. Johnson [6] synthesized a number of the lower homologues of a series of alkyl resorcinols of the general formula:

the alkyl chain being *ortho* to one hydroxyl group and *para* to the other. The methyl, ethyl and n-propyl compounds made at that time, and later the n-butyl derivative, were examined as to their bactericidal properties



Effect of alkylation of resorcinol.

by Leo Rettger,[8] who found a very rapid increase in the phenol coefficient as the series was ascended.

These results were considered of sufficient promise to justify a biologic investigation of these compounds, and samples were sent to me in 1914 for this purpose.[7] At this time I found that, coincident with the sharp rise in bactericidal power there was a sharp drop in toxicity. In other words, alkylation of resorcinol decreases its toxicity and at the same time increases its bactericidal power in direct proportion to the molecular weight of the alkyl chain.

The investigation has since been continued, with long interruptions due to difficulty in obtaining material, the object being to develop, through the application of these principles, a substance possessing a maximum of bactericidal power and a minimum of toxicity.

3. Hinman, Frank: An Experimental Study of the Value in the Urine of the Internal Use of Hexamethylenamin, J. A. M. A. 61: 1601 (Nov. 1) 1913.
4. Davis, E. G.: Urinary Antisepsis, J. A. M. A. 70: 381 (March 2) 1918. Davis, E. G., and White, E. C.: J. Urol. 2: 107 (April) 1918. Davis, E. G.; White, E. C., and Rosen, R.: Ibid. 2: 277 (Aug.) 1918. Davis, E. G.: Ibid. 2: 299 (Aug.) 1918; Am. J. M. Sc. 161: 231 (Feb.) 1921.
5. Hale: Bull. 88, p. 7, Hyg. Lab., U. S. P. H. S., 1913.
6. Johnson, T. B., and Hodge, W. W.: J. Am. Chem. Soc. 35: 1014 (Aug.) 1913. Johnson and Lane: Ibid. 43: 348, 1921.
7. The samples of the n-propyl compound obtained at this time consisted of yellowish or yellowish brown powders which were known to be impure and were soluble in water only to the extent of about 2 per cent. The n-propyl compound has since been obtained as a pure white, crystalline substance melting to a colorless oil at from 78 to 79 C., and soluble in water to the extent of 25 per cent.

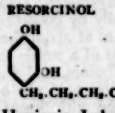
The pronounced influence of the alkyl side chain in increasing the bactericidal power of the mother substance (resorcinol) is shown in the chart. Plotting the phenol coefficients as ordinates against the molecular weights of the alkyl radicals as abscissas (Johnson), a curve is obtained which rises sharply, regularly and continuously through the normal (straight chain) compounds, reaching its peak at the n-hexyl derivative, which exhibits a phenol coefficient of 46. In this remarkable substance we find the bactericidal power of resorcinol multiplied over 150 times. The iso compounds (branched chains) are found to be less powerful than the corresponding normal derivatives. All of these substances may be administered by mouth to rabbits in large doses (1 gm. per kilogram) without apparent toxic effect. The minimal lethal dosage for these substances has not been determined, so that it cannot be said that toxicity continues to decrease in the same regular manner in which the increase in bactericidal power accompanies the addition of each carbon atom to the alkyl chain, although some such relationship may well exist.

Application of these principles to practically every available phenolic nucleus has led to indifferent results.

It had previously been determined that the urine of rabbits receiving n-propyl resorcinol gave the same reddish brown coloration on treatment with ferric chlorid as given by aqueous solutions of this substance. It was therefore decided to submit the alkyl resorcinols, as a group, to a thorough investigation with a view to developing an internal urinary antiseptic.

Bactericidal urine was obtained not infrequently in rabbits after oral administration of each of the seven alkyl resorcinols described in this paper, but in this regard n-hexyl resorcinol was found to be so far superior to the lower homologues that detailed discussion will be limited to this substance.

HEXYL RESORCINOL



As measured by the Hygienic Laboratory method now in use,[8] this substance is believed to be one of the most powerful organic germicides ever described. Some of the phenol coefficient determinations[9] have run as high as 52, the lower determinations being in the neighborhood of 46. A search of the literature has not revealed an account of any stable organic compound with a phenol coefficient even approaching these figures.

Bactericidal Properties in Human Urine.—Unlike a great many antiseptics and germicides, hexyl resorcinol retains its bactericidal power when dissolved in urine of either acid or alkaline reaction.

The dilutions listed below were determined for this substance in water and in acid and alkaline human urine by the following technic:

To 1 c.c. of each dilution was added one 3 mm. loopful of a twenty-four hour broth culture of the organism, which had been carried through broth daily for at least five days. A transfer from the inoculated tube was then made immediately to agar as proof that the organism was viable and that the inoculation had been made. After one hour incubation at 37 C., transfers were made to agar, and again at the end of twenty-four hours.

The stock solution and all dilutions were freshly prepared for each experiment. The urine used was always freshly voided. Alkaline urine was obtained by adjustment of the reaction with normal potassium hydroxid.

The same strains of *B. coli* and *Staphylococcus albus* were used throughout these and all subsequent experiments. A mixture of three strains of *B. coli* was used to avoid the possibility of the employment of a delicate strain. All strains used were isolated from pyelitis cases.

*Bactericidal Properties of Hexyl Resorcinol: Maximum Dilutions Destroying Test Organisms in Water and in Human Urine**

	Water		Acid Urine pH 6 to pH 6.4		Alkaline Urine pH 7.6 to pH 8.2	
Organism	1 Hour	24 Hours	1 Hour	24 Hours	1 Hour	24 Hours
B. coli	1:12,000	1:20,000	1:10,000	1:10,000	1:10,000	1:18,000
Staphylococcus albus	1:100,000	1:110,000	1:60,000	1:70,000	1:18,000(?)	1:80,000

* The tendency of this substance to cause immediate clumping of the bacteria is frequently responsible for poorly defined end-points.

Toxicity to Rabbits.—Rabbits not only tolerate large single doses (from 1 to 2.5 gm.) of this substance by mouth without apparent toxic effect, but remain normal in all respects when fed large daily doses (0.5 gm.) for a period of three weeks. Following these intensive courses, the animals kept for observation over a period of four months continued to gain weight. The urine and kidney function remained normal, and at no time during or following the experiments were any toxic symptoms exhibited. Daily chemical and microscopic examination of the urine failed to reveal albumin,[10] blood, pus or casts in a single instance. The organs of those animals killed at the conclusion of the course were found to be normal on gross and microscopic examination.

A pregnant rabbit weighing 2,350 gm. received 2.5 gm. of hexyl resorcinol in a single dose, which is equivalent to about 70 gm. for a 150 pound (68 kilogram) adult. Not only was there no evidence of any toxic action, but the pregnancy continued normally, a litter of four fully developed young being born alive twenty-three days later.

A rabbit weighing 3,000 gm. was given 0.083 gm. of hexyl resorcinol intravenously in a 1:600 aqueous emulsion. This dose, equivalent to 28 mg. per kilogram of body weight, required the injection of 50 c.c. of emulsion. The experiment was stopped at this point to avoid the necessity of interpreting possible toxic results due to the volume of fluid introduced. There were no immediate or remote toxic effects. When killed two months later, this animal had gained 300 gm. in weight, all organs were normal in gross appearance, and the liver and kidney were microscopically normal. Given intravenously in aqueous emulsion, a hematuria may develop immediately. Subcutaneous injection of strong solutions in oil causes a local necrosis of the tissues.

Solutions of hexyl resorcinol in olive oil are mildly irritant, while solutions in alcohol, ether and chloroform are very irritant. All are astringent.

Secretion of Bactericidal Urine by Rabbits After Single Doses of Hexyl Resorcinol.—Following oral administration of single doses of hexyl resorcinol, the

8. Pub. Health Rep., July 8, 1921.
9. I am indebted to Dr. J. C. Sweetser for his painstaking investigation of the phenol coefficients reported in this communication.

10. The conjugates appearing in rabbit urine after large doses will give a false reaction for albumin with all the usual tests. Exton's test (J. A. M. A. 80:529 [Feb. 24] 1923) and the potassium iodid test (Hawk: Physiological Chemistry, Philadelphia, P. Blakiston's Son & Co., 1913; Pharm. Ztschr. 54:612) were used for this reason.

urine secreted by rabbits within one hour of the dose will frequently destroy *B. coli* and *Staphylococcus albus*, while specimens obtained as late as twenty-four hours later may exhibit equally definite bactericidal properties.

The technic employed in these experiments was as follows:

Male rabbits were used exclusively.

Control Urine: The animal was immobilized and the bladder emptied by catheter. Following this, the dose was given immediately.

Administration: Each dose, accurately weighed and dissolved in olive oil, was introduced into the stomach by means of a medium size soft rubber catheter and syringe.

Catheterization: At intervals following each dose, the animal was again catheterized. Strictly aseptic methods were soon abandoned for the reason that even with the most painstaking care it was found there could be no assurance that a given specimen of urine was sterile. When, on the other hand, no precautions were used other than ordinary cleanliness, the number of contaminants per cubic centimeter of urine was found to be fairly constant, the specimens being, therefore, more nearly comparable to one another. Once obtained, each urine specimen was treated as if it were sterile.

Method of Determination of Bactericidal Properties of Urine: One cubic centimeter portions of the urine obtained before drug administration (control) and of each specimen obtained at intervals thereafter were distributed in two series of sterile test tubes. To one series was added one 3 mm. loopful of a twenty-four hour broth culture of *B. coli* and to the other *Staphylococcus albus*. Transfers were made immediately to agar to prove the viability of the organism and to be certain that the inoculation had been made as intended (control). After from eighteen to twenty-four hours' incubation at 37 C., transfers were again made to agar and the tubes inspected at the end of twenty-four hours' incubation. Unless both organisms grew luxuriantly in the control urine obtained before drug administration, the experiment was discarded. This happened occasionally. If no colonies were visible, the specimen of urine was recorded as bactericidal to the organism added, whereas, if a single colony appeared, the urine was recorded as devoid of bactericidal action. Urines, therefore, recorded as bactericidal destroyed not only the organisms added but all contaminants as well.

Sixty-eight per cent. of the seventy-nine urine specimens obtained from rabbits at intervals of from one to twenty-eight hours after single doses of from 0.2 to 0.5 gm. of hexyl resorcinol were found to be bactericidal.

The expectancy of bactericidal urine rises abruptly during the first hour to 53 per cent., and continues through 75 per cent. at the second hour to 92 per cent. at the third. From this point the curve drops off, yet, of the specimens obtained from eighteen to twenty-eight hours after drug administration, 56 per cent. were bactericidal.

One incident deserves special mention. A rabbit weighing 2,050 gm. received 0.3 gm. of hexyl resorcinol and voided fifty minutes later. The urine, which had run over fecal material in the bottom of the basket holding the animal and had trickled out on the table, was mopped up with absorbent paper toweling and squeezed into a chemically clean beaker. One cubic centimeter portions of this urine not only destroyed the large number of contaminants present, but a loopful of each of the test organisms as well. The urine obtained from this animal just before drug administration, fifty minutes previously, proved to be a suitable culture medium for the test organisms.

The reaction of the urine secreted by these rabbits did not influence its bactericidal action. Many examples were encountered in which alkaline, acid and neutral specimens destroyed both test organisms.

Bactericidal urine has never been obtained after intravenous injection of any of the alkyl resorcinols. The lower derivatives cause a slough at the point of injection. Bactericidal urine appears promptly after rectal administration of hexyl resorcinol to rabbits.

Bactericidal urine has been obtained in rabbits following the oral administration of doses as low as 0.1 gm. Twenty-five times this amount in a single dose is tolerated without apparent toxic effect. The minimal lethal dose has not been determined.

ADMINISTRATION OF HEXYL RESORCINOL TO NORMAL MEN; TECHNIC; EVIDENCE OF NONTOXICITY

After it had been determined that a 25 per cent. solution of this substance in olive oil could be swallowed without unpleasant effects, five normal men were selected for the purpose of testing the secretion of bactericidal urine during courses of increasing doses. These subjects varied in age from 23 to 66 years, and in weight from 127 to 195 pounds (57.6 to 88.5 kg.). Urinalysis and the functional activity of the kidneys were normal in each case.

Form of Administration.—The substance was given in olive oil solution in gelatin capsules,[11] the concentration varying from 20 to 50 per cent. Three doses were administered daily; the first at 9 a. m. (about one hour after breakfast), the second at noon (before the midday meal) and the third at 4 or 5 p. m. A urine specimen was obtained from each individual just before each dose.

Collection of Specimen; Urinalysis.—The urine was obtained aseptically by collection of the specimen from the urinary stream at about the middle portion of each voiding, by means of a sterile test tube. Each specimen was tested for albumin, and a microscopic examination made to detect any evidence of renal irritation. The reaction was tested with litmus paper. If frankly acid or alkaline, it was recorded as such. If nearly neutral, a hydrogen ion determination was made and the specimen recorded as neutral if between p_H 6.8 and p_H 7.2.

Method of Determination of Bactericidal Properties of Urine.—Each specimen of urine was submitted to precisely the same tests for bactericidal action against *B. coli* and *Staphylococcus albus* as described above with rabbit urine, the technic employed being exactly the same and the results recorded in the same manner.

Evidence of Nontoxicity to Man.—Each of five normal men received repeated doses of hexyl resorcinol from Monday morning to Saturday noon for six consecutive weeks, in amounts ranging from 0.13 to 0.68 gm. three times a day, in concentrations in olive oil varying from 20 to 50 per cent.

Each subject received during these tests a total of more than 45 gm. Much larger quantities than this have since been taken by patients with urinary tract infections without toxic effects.

None of the five normal subjects experienced any toxic symptoms at any time. One could not take the solution in 50 per cent. concentration on an empty stomach without nausea. A glass of milk with the

11. The crystals have since been administered in enteric coated capsules.

dose, however, prevented all manifestations of gastric irritation in this case.

Three urine specimens a day from each individual were examined for albumin, blood, pus and casts during the entire time. In no instance was any abnormality found. At the conclusion of the experiments, the functional activity of the kidneys (phenolsulphonephthalein) was normal in each case.

The first few doses showed some cathartic action in two of five subjects. This effect disappeared in two or three days, however, in spite of increased dosage.

Bactericidal urine has been obtained in a man weighing 68 kg. following oral administration of 0.13 gm. of hexyl resorcinol, which is less than one five-hundredth part of the relative dose (1 gm. per kilogram) which is tolerated by rabbits without toxic effect. Daily administration of thirty times this amount, i. e., 1 gm. four times a day for two consecutive weeks, has been tolerated by patients without any toxic effect whatever. Intestinal irritation usually prevents the use of these large doses.

SECRETION OF BACTERICIDAL URINE BY NORMAL MEN DURING ADMINISTRATION OF HEXYL RESORCINOL

On doses of from 0.25 to 0.5 gm. of hexyl resorcinol three times a day, normal men secrete urine which kills *B. coli* and *Staphylococcus albus*.

On doses of less than 0.25 gm. three times a day, the secretion of bactericidal urine was only occasional, although C. K. secreted urine which destroyed the colon bacillus on doses as small as 0.13 gm.

Bactericidal urine began to appear with considerable regularity on doses of from 0.25 to 0.4 gm., the urine of C. K. having been almost continuously bactericidal during the entire week on these doses. On the other hand, E. C. proved to be resistant to these and larger doses.

Marked individual variation was shown on 0.33 gm. doses. The urine of J. C. killed both organisms with considerable regularity, while that of C. B. showed very little bactericidal action at any time, the results being poorer than the week previous, when he was receiving smaller doses. E. C. proved to be somewhat resistant to these and even larger doses, while the urine of V. L., although destroying the colon bacillus with great regularity, killed the staphylococcus only once. It would seem likely not only that individuals vary as to the dose necessary to cause the secretion of bactericidal urine, but also that the same individual may vary from week to week in this regard. This seems also to be true when we compare the action of the urine of a given individual on any one particular type of organism.

The results of a three weeks' course of hexyl resorcinol to these five normal subjects, in doses known to cause the secretion of bactericidal urine, were as follows: Of 251 specimens of urine obtained at intervals of from three to sixteen hours after the last dose, 150 specimens, or 60 per cent., were bactericidal to one or both organisms.

B. coli was destroyed by 137 of these specimens (54 per cent.), while *Staphylococcus albus* survived in all but fifty-three specimens (21 per cent.). This unexpected result may have been due in part to the small quantity of urine (1 c.c.) used in the tests. Five cubic centimeter portions of these urines frequently destroyed one 3 mm. loopful of a broth culture of the staphylococcus when a 1 c.c. portion of the same specimen failed to do so. On the other hand, the colon bacillus is apparently much less sensitive to relatively large volumes of the urine. The concentration of the bactericidal substance appears to be the all important factor conditioning disinfectant action in this case.

Information regarding the velocity of disinfection by these bactericidal urines is as yet insufficient for detailed report. It may be said, however, that not infrequently *Staphylococcus albus* is completely destroyed in one hour, while this is a very rare occurrence with the colon bacillus, at least under the conditions of time, dosage, etc., obtaining in these experiments.

The expectancy of bactericidal urine varied from 30 per cent. in the case of E. C. to 81 per cent. in the case of C. K. under identical conditions of time and dosage. Comparing the results at a given interval following the last dose, we find that 100 per cent. of seventeen specimens of urine obtained from C. K. at the third hour were bactericidal, while only 12 per cent. of seventeen specimens obtained from E. C. at the third hour, under identical experimental conditions, showed bactericidal action.

The influence of the time elapsed since the last dose, on the expectancy of bactericidal urine in man, parallels that shown by rabbits. From the end of the first to the beginning of the third hour the curve rises sharply to 63 per cent., climbs to 66 per cent. at the three to five hour interval, and to 75 per cent. at the six to eight hour interval. At the fifteen to twenty hour interval, the curve was found to drop off only to 45 per cent.

The last figure is an important one. As 45 per cent. of seventy-four urine specimens obtained from five normal individuals from fifteen to twenty hours after the last dose, showed bactericidal action, the clinical possibility of a continuous flow of bactericidal urine becomes apparent. All these specimens were obtained in the morning from two to three hours after rising. On one occasion, the subject voided at 7 a. m. The specimen examined was voided at 8 a. m., fifteen hours after a dose of 0.4 gm., and must have been secreted between the end of the fourteenth and the beginning of the fifteenth hour. This urine destroyed both organisms.

Influence of the Reaction of Urine Secreted During Course of Hexyl Resorcinol on Its Bactericidal Properties.—Hexyl resorcinol retains its bactericidal properties in vitro, when dissolved in human urine, regardless of the reaction. Also the urine secreted by rabbits receiving this substance retains its bactericidal action regardless of the reaction. The five normal subjects used in these experiments secreted neutral or alkaline urine only very occasionally. A few of these alkaline or neutral specimens were found to be bactericidal, but in order to obtain more comprehensive data on this point a large dose of sodium bicarbonate was administered with each dose of hexyl resorcinol, with surprising results. With the exception of three, all alkaline specimens of urine obtained were found to be inert, actively bactericidal urine reappearing almost coincidently with the reappearance of urine of a neutral or acid reaction, on discontinuance of the soda.

Supposing that the soda given with the hexyl resorcinol might in some way limit or destroy its action regardless of the alkalinity of the urine, a series of experiments was undertaken in which the soda was administered at intervals between doses of hexyl resorcinol, which practically precluded any direct interaction of the two substances in the stomach. The results were much the same as in the preceding experiments. Although *Staphylococcus albus* was killed by one specimen of alkaline urine, the appearance of bactericidal urine was practically coincident with the reap-

pearance of acid urine, on withdrawal of the sodium bicarbonate.

These results being very puzzling, the problem was attacked differently, the bactericidal properties of the acid urine ordinarily secreted by these men while receiving hexyl resorcinol being compared with the bactericidal activity of the same specimens when titrated to alkalinity (p_H 8) with normal potassium hydroxid. It was found that the titration by no means destroyed the bactericidal action. The colon bacillus appears to be more easily killed if the urine is acid, but *Staphylococcus albus* succumbs more readily in alkaline than in acid urine. In any event, it is perfectly clear that the administration of sodium bicarbonate with hexyl resorcinol is contraindicated.

TREATMENT OF URINARY TRACT INFECTIONS WITH HEXYL RESORCINOL

Clinical application of these results is now in progress. The number of cases is as yet too small to form the basis of broad conclusions, but a few very definite statements are justified by the results in hand.

The statements below apply only to the use of hexyl resorcinol in chronic urinary tract infections in adults without other treatment, unless otherwise noted.

In urinary infections due to *Staphylococcus albus, Staphylococcus aureus* and *Streptococcus anhemolyticus,* hexyl resorcinol by mouth has resulted in prompt disappearance of these organisms from the urinary tract in each case. *B. Pyocyaneus* has disappeared quite as promptly in a number of instances. A recurrence, even after all treatment has been discontinued for several months, has yet to be observed.

When the bacterial count is not high, urinary infections due to *B. coli* may be cleared up completely with no other treatment than hexyl resorcinol by mouth. None of these have recurred on the discontinuance of treatment. This organism is the most resistant yet encountered, and persistent treatment may be necessary to effect complete disinfection of the urinary tract even when the bacterial count in the urine is low. It is rather difficult to explain satisfactorily the apparently paradoxical fact that the urine secreted by normal men receiving this substance will destroy the colon bacillus far more frequently than the staphylococcus when incubated for from eighteen to twenty-four hours under identical conditions. A mixture of three strains of *B. coli,* all isolated from pyelitis cases, was used in these tests to avoid the possibility of employing a delicate strain. On the other hand, this urine kills the staphylococcus in a shorter time than the colon bacillus, and an explanation of the clinical results obtained may depend on a study of the relative velocity of disinfection of these organisms by the bactericidal urine concerned.

In any event, it seems highly probably that heavy infections of the urinary tract with *B. coli* cannot be cleared up with hexyl resorcinol without a temporary reduction in the number of organisms present by some other means, such as the usual local treatment, which would afford this substance an opportunity to complete the disinfection. This is very unfortunate for the reason that chronic infections of the urinary tract with high *B. coli* counts are very common in children, instrumentation of the urinary tract being out of the question in most of these cases. Also, in the treatment of acute pyelitis of pregnancy, the usual finding being a very high count of *B. coli* in the urine, the same objections may obtain. This is of less moment, however, for the reason that these cases show the same tendency to spontaneous recovery exhibited by most acute infectious processes, and clear up satisfactorily in the majority of instances when the simple hygienic measures ordinarily employed are instituted.

As might be expected, mixed infections of the urinary tract with *B. coli* and any of the organisms mentioned above show a pure culture of *B. coli* in the urine shortly after treatment is begun, all other organisms having been killed off.

In chronic urinary tract infections, there is usually very decided symptomatic improvement, regardless of the type or number of organisms involved, on doses that are too small to complete the disinfection. Withdrawal of the drug in these cases has usually resulted in prompt reappearance of the symptoms.

The crystals have been administered in enteric coated capsules to avoid gastric irritation, the doses varying from 0.33 to 1 gm. three times a day. The first few doses of hexyl resorcinol frequently show a decided cathartic action due, no doubt, to intestinal irritation. This effect usually disappears within forty-eight hours, although it may last much longer. It has proved to be a serious disadvantage in a few cases, necessitating a material reduction in the dose. On the other hand, patients who have been habitually constipated have volunteered the information that daily spontaneous evacuation of the bowels has occurred while under treatment. Some patients tolerate doses as high as 4 gm. a day, but this quantity ordinarily causes marked intestinal irritation.

MECHANISM OF ACTION

Although hexyl resorcinol is secreted promptly, and certainly in large part, in the urine it is apparent that the bulk of each dose appears in the urine in an inert form. This is indicated by the fact that the concentration of substances in the urine giving the characteristic red color with nitric acid does not indicate the degree of bactericidal power shown by that specimen. In fact, a urine specimen showing a brilliant test may be quite inert, while one yielding only the faintest color or none at all may be actively bactericidal (rabbits). The explanation lies in the fact that by far the greater portion is secreted as a conjugate which is inert but yields the color test. We depend, for the bactericidal action in the urine, on the small amount of hexyl resorcinol secreted unchanged. If we could prevent conjugation, very tiny doses would be sufficient. As a matter of experience, large doses, such as from 1 to 2 gm. a day, are indispensable.

It might be argued that although a large percentage of each dose of hexyl resorcinol appears in the urine, only a small percentage appears *unchanged,* and that Davis' fifth qualification is therefore not satisfied. This argument loses force, however, when it is considered that normal men may secrete urine which is bactericidal to *B. coli,* for instance, on a small fraction of the average therapeutic dose.

The very careful studies of Harriette Chick [12] have conclusively demonstrated that disinfection is an orderly time process exhibiting all the mathematical characteristics of a chemical reaction of the first order—a so-called unimolecular reaction. Admitting disinfection to be a chemical process and regarding the bacteria as one reagent and the active germicide as the other, we would expect a mixture, such as urine, containing an excess of bacteria over germicide, not only to contain viable

12. Chick, Harriette: Tr. VIII International Cong. Applied Chem. 20: 147, 1912.

organisms, but also to prove to be a suitable culture medium for the surviving organisms, all of the available germicide having been bound and rendered inert in killing off a certain proportion of the bacterial population.

Incubation of such a mixture should show a large increase in the number of bacteria. On the other hand, suppose this mixture to contain an excess of active germicide over bacteria. All the bacteria would be destroyed. There would be left, however, an excess of uncombined and active germicide capable of killing more organisms added to this mixture; i. e., this urine would possess bactericidal properties. This, in fact, is precisely what occurs.

In the treatment of a urinary infection with hexyl resorcinol, it is probable that small quantities of this substance in the free state are secreted in the urine continuously, certainly from time to time. The urine of these patients while under treatment, but before disinfection of the urinary tract has been completed, has invariably proved to be a suitable culture medium for the organisms present, while after complete disinfection, the sterile urine obtained will destroy broth cultures of the same strain if the patient is still receiving the drug.

This can be easily demonstrated in women, as there is no possibility of organisms entering the urinary tract in considerable numbers from other organs. On the other hand, the treatment of males with infections of the upper urinary tract and internal genital appendages as well, such as the seminal vesicles and prostate, offers additional evidence of the correctness of the hypothesis on which the explanation of the facts recorded is based. In these cases, even after complete disinfection of the urinary tract, as proved by renal catheterization, the freshly voided urine almost invariably contains viable organisms which have presumably been discharged into it from the genital tract. Such a specimen of urine may become sterile or show luxuriant bacterial growth on incubation, depending, no doubt, on whether the bacteria or the active germicide happens to be present in excess.

SUMMARY AND CONCLUSIONS

1. Alkylation of resorcinol decreases toxicity and at the same time its bactericidal power in direct proportion to the molecular weight of the alkyl chain. The maximum effect is reached in the six carbon atom straight chain derivative—normal hexyl resorcinol.

2. As a group, the alkyl resorcinols are biologically unique in that they are far more powerful germicides than any substances ever described as possessing an equal degree of nontoxicity to animals and man.

3. As administered to man, hexyl resorcinol meets the experimental qualifications enumerated by Davis as essential to the ideal internal urinary antiseptic in the following manner: It is chemically stable, nontoxic in therapeutic doses, nonirritating to the urinary tract, bactericidal in high dilution in urine of any reaction, and is excreted by the kidney unchanged in sufficient percentage to impart active bactericidal properties to the urine. Furthermore, it is administrable by mouth, secreted in the urine at a rate which admits of continuous local action in the urinary tract, and, finally, the urine secreted possesses a destructive (bactericidal) action against organisms exposed to it rather than mere growth inhibiting (antiseptic) properties.

4. The bulk of each dose is excreted as a conjugate which is probably inert. The secretion of bactericidal urine depends on the small quantities of unchanged substance appearing in the urine.

5. The results to date justify the following statements regarding the use of hexyl resorcinol as an internal urinary antiseptic in chronic urinary tract infections in adults:

(*a*) In urinary tract infections due to *Staphylococcus albus, Staphylococcus aureus,* the streptococcus and some strains of *B. pyocyaneus,* oral administration of hexyl resorcinol, without other treatment, has resulted in prompt and complete disinfection of the urinary tract, with consequent clearing of the urine and disappearance of symptoms. No recurrences have been observed after several months without treatment.

(*b*) Urinary tract infections due to *B. coli* have been cleared up completely with no other treatment than hexyl resorcinol by mouth, and have not recurred on discontinuing treatment for several months. Persistent treatment is usually necessary in these cases even when the bacterial count is low. Cases with high counts of *B. coli* in the urine are extremely resistant even to intensive courses of the drug, and it is highly probable that in this type of case the usual local treatment will be found necessary in order to reduce the number of bacteria present to a point which will afford the drug an opportunity to complete the disinfection. Evidence is increasing that failure on the part of hexyl resorcinol to complete the disinfection of the urinary tract in these cases indicates the existence of pyelonephritis.

(*c*) In mixed infections of the urinary tract with *B. coli,* together with any of the foregoing organisms, the urine has shown a pure culture of *B. coli* shortly after the starting of treatment, all other organisms having been killed off.

(*d*) There may be pronounced symptomatic improvement on doses which are too small to complete the disinfection.

6. Although hexyl resorcinol retains its bactericidal power in alkaline urine, the administration of sodium bicarbonate completely prevents the secretion of bactericidal urine.

7. As measured by the U. S. Hygienic Laboratory method of standardizing disinfectants (phenol coefficient), hexyl resorcinol is by far the most powerful germicide ever described as possessing anything like its degree of nontoxicity to animals and to man. The biochemical principles that led to its synthesis, through an orderly and logical application of the experimental facts observed, may be of fundamental importance.

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ABSTRACT OF DISCUSSION

DR. HUGH H. YOUNG, Baltimore: Dr. Leonard's cases seem to prove conclusively the value of the drug. In the laboratories and clinics of the Brady Urological Institute we have been much interested in the problem of urinary antiseptics. Eight years ago we began a series of researches. Our idea at first was to combine with phenolsulphonephthalein certain chemicals that would produce a compound which would be eliminated through the kidneys as a germicide. Dr. E. C. White, chemist of the department, proceeded to make a number of combinations, which were tried out experimentally and clinically by Dr. E. G. Davis. Some proved of great interest, but were not particularly effective. Since then, many other workers in the laboratory and clinic have been engaged on this problem, and after testing out 300 or more drugs, three have been shown to be of great clinical value. One of these, mercurochrome-220 soluble, needs no general description from me. Of late it has been shown that it can be injected intra-

venously and will be eliminated through the urinary and intestinal tracts in germicidal strength. We have also shown that it can be taken by mouth in increasing doses up to 1 gm. daily without deleterious effect. After both intravenous and oral administration, frequent stools are apt to occur, but we have had no serious reactions. When given intravenously or by mouth, we have seen cases of pyelitis and cystitis clear up promptly. It is apparently more effective against the staphylococcus and streptococcus than against the colon bacillus, but some of the latter infections are occasionally cured. More remarkable still has been the recent use of mercurochrome to combat septicemia and local infections by intravenous injection, and some truly marvelous results have occasionally been obtained. I might mention the case of a boy, aged 4 years, with general streptococcus infection associated with suppurative glands of the neck following scarlet fever. This boy, with a temperature of 105 F., unable to swallow and practically unconscious, was cured by an intravenous injection of 15 c.c. of a 1 per cent. solution of mercurochrome (7.5 mg. per kilogram). Other cases almost as startling have been reported by us and others.

DR. PAUL J. HANZLIK, San Francisco: I should like to ask Dr. Young a question. What special advantage is there in administering hexamethylenamin intravenously over oral administration, bearing in mind that intestinal absorption and urinary excretion of the drug are very rapid, and that the urinary antiseptic action is not so much a question of concentration of the drug in the blood and urine, as it is of hydrogen-ion concentration (acidity) of the urine for the liberation of free formaldehyd?

DR. YOUNG: I cannot answer that question.

DR. GEORGE G. SMITH, Boston: We must remember, in attempting to sterilize the urinary tract, that there are certain conditions which must be fulfilled in order that the drug may come in contact with the infective agent. We may have a pus kidney in which the circulation is so involved that the substance which would normally be excreted in the urine cannot be excreted and consequently the infection will persist. It is necessary, therefore, that in the treatment of these cases of urinary infection a clear idea should be held of the exact situation; that is, a complete diagnosis must be made, based on the study of the capacity of the renal pelvis, the degree of obstruction, and the amount of damage to the kidney tissue. I know that Dr. Leonard would not claim results in a case in which circulation of the kidney is impaired. This is simply a word of warning against the indiscriminate use of this new drug, regardless of the underlying pathologic conditions.

DR. EDWIN DAVIS, Omaha: To me, the most interesting part of Dr. Leonard's paper is the demonstration of the relationship between chemical structure and antiseptic properties. Taking his resorcinol molecule, he has demonstrated increasing bacteriologic efficiency, together with decreasing toxicity, as he increases the number of carbon atoms in the side chain. This would seem to be the ideal application of chemotherapy. I know of no field in which there is a more urgent clinical need than in the field of urinary antisepsis. There are many obstacles in the way of developing such a drug. We find that drugs in the laboratory which are antiseptic in water lose this property in urine, and those which are antiseptic in urine fail to be antiseptic in tissue fluids. When we come across a drug that fulfils the requirements in the laboratory, there are difficulties in the way of determining whether this drug is clinically efficient. Are we obtaining results? For instance, after administering a drug we notice an improvement. Is this on account of the drug or would it have taken place anyway? Those who have observed urinary infections know that there occur frequently day-by-day variations, spontaneous or automatic, in the pus and bacterial content of the urine of the same individual, for no known reason. We know it is useless to administer any conceivable drug by mouth in the presence of a so-called accessory cause of infection, such as stone, tumor or retention, involving any portion of the urinary tract. Finally, I should like to ask Dr. Leonard whether he has taken account of the fact that frequently the urine of dogs or rabbits may possess "automatic" antiseptic properties in the absence of any drug whatever.

DR. W. G. EXTON, New York: Dr. Leonard's contribution is very promising. I should like to ask whether the administration of the drug interferes with any of the usual urinary tests. I should also like to know whether it has any possibilities as a preservative for urine, because thousands of specimens are being examined every year which are absolutely unfit for analysis on acount of the lack of a really efficient preservative for urine.

DR. VEADER LEONARD, Baltimore: Hexyl resorcinol retains its germicidal activity in urine of either acid or alkaline reaction. Unless the first few doses are small (5 grains) there may be definite intestinal irritation, as evidenced by catharsis. This ordinarily disappears in two or three days, in spite of increased dosage. I have seen only one case in which there was continued catharsis on average doses. On doses that are too small to eradicate the infection there is, nevertheless, a remarkable subsidence of symptoms, and pus largely disappears. In spite of large and long continued doses to rabbits, normal men and patients with urinary infections, there has never been the slightest evidence of irritation of the kidney. Dr. Young mentioned Dr. Davis' extensive work with various dyestuffs as urinary antiseptics. I have had some experience with these and found, as did Dr. Davis, that if they are excreted by the kidney they lose their germicidal activity in urine, while if they remain active in urine, they are not excreted by the kidney. There must be some biochemical mechanism that governs this. It could hardly be a matter of chance, as it has happened with more than 400 compounds, as Dr. Davis has shown. The question has been asked whether the fact that rabbits and dogs not infrequently secrete antiseptic urine has been taken into consideration. The animal experiments were, of course, carefully controlled. Unless the test organisms grew luxuriantly in the urine obtained just before drug administration, the experiment was discarded. Dr. Exton asked an interesting question. In my early work on rabbits, I was convinced that I was getting positive tests for albumin in the urine until his article appeared. Using his reagent boiling hot, I found it was not albumin at all but conjugates that were interfering with the tests. This does not apply in man, nor does it apply to solutions of hexyl resorcinol in human urine. I anticipated the question as to whether the improvement in the clinical cases was actually due to drug administration, by selecting cases, so far as was possible, which were of long standing and which had resisted other treatment. In the cases reported, the patients received no other treatment than hexyl resorcinol by mouth.

A METABOLISM STUDY OF ETHYLENE ANESTHESIA *

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AND
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Since the introduction of ethylene as a general anesthetic by Luckhardt and Carter,[1] it has been successfully administered by Drs. Isabella Herb and Mary Lyons to more than 2,000 patients at the Presbyterian Hospital without a fatality. In general surgery, Luckhardt and Lewis[2] report most favorably on its use, from a clinical standpoint, in no less than 800 operations. Their observations and conclusions were confirmed by Brown[3] Henson[4] and finally by Allgeyer,[5] who reports its use with 100 patients. In genito-urinary

* From the Laboratories of the Presbyterian Hospital.

1. Luckhardt, A. B., and Carter, J. B.: The Physiologic Effects of Ethylene, J. A. M. A. 80:765 (March 15) 1923.
2. Luckhardt, A. B., and Lewis, Dean: Clinical Experiences with Ethylene-Oxygen Anesthesia, J. A. M. A. 81:185 (Dec. 1) 1923.
3. Brown, W. E.: Ethylene as a General Anesthetic, Am. J. Surg., Anesth. Supp. 28:14 (Jan.) 1924.
4. Henson, E. B.: Ethylene: Its Uses as a Routine Anesthetic, West Virginia M. J. 20:19 (Jan.) 1924.
5. Allgeyer, E. E.: Report of One Hundred Anesthetics Administered with Ethylene Gas, New Orleans M. & S. J. 76:383 (Jan.) 1924.

surgery, Luckhardt and Kretschmer [6] found ethylene-oxygen the anesthetic of choice, especially in the presence of pulmonary, cardiac, vascular and renal lesions. In obstetric and gynecologic work, Heaney [7] has reported it superior to nitrous oxid in some respects, and finally, in infants, Lundy [8] prefers it to all other anesthetics.

However safe ethylene-oxygen anesthesia has been demonstrated clinically at the Presbyterian Hospital and elsewhere, its real efficacy, after all, depends on the chemical and pressure changes of the blood produced during its administration in human beings. Experimentally, Leake and Hertzman [9] found the changes in blood sugar and alkali reserve in dogs under ethylene-oxygen anesthesia much less in rate and degree than with either chloroform or ether.

Twenty-four persons between the ages of 17 and 64 years were used for this investigation, twenty-three patients receiving the usual preoperative care and one, H. A. O., serving as control. All except a few were taken without discrimination. Ethylene in a concentration of from 85 to 90 per cent., with oxygen, was administered to the control for sixty minutes with a McKesson gas machine. It was administered in like manner to twenty-one patients for surgical anesthesia in a concentration of from 70 to 95 per cent. for an average of thirty-two minutes, and of these, three had rather severe diabetes mellitus. A period of from three to seven minutes was necessary, as a rule, to produce surgical anesthesia. Two of the twenty-three patients received ethylene-ether because of incomplete relaxation.

The desired amount of blood was drawn into an ordinary 20 c.c. syringe from the median vein and then immediately emptied into a tube containing a few crystals of potassium oxalate. In this manner blood was drawn just before, immediately after, and, in a few instances, twenty-four hours after the operation. The blood was immediately centrifugated, and the clear plasma drawn off by means of a pipet and used for the determination of blood sugar, the plasma carbon dioxid (alkali reserve), urea, uric acid, creatinin, and nonprotein nitrogen. For determining the plasma carbon dioxid, the method of Van Slyke [10] was used, and for blood sugar, urea, uric acid, creatinin and nonprotein nitrogen the method of Folin and Wu.[11]

The blood pressure of these twenty-four persons was measured before, at five minute intervals during, and immediately after the anesthesia, with a Tycos sphygmomanometer and a Bowles stethoscope, the latter rather firmly held to the cubital fossa with adhesive plaster.

Operations were performed for inguinal hernia, acute appendicitis, gangrene of the toes and feet (diabetic), gallbladder disturbances, malposition of the uterus, hemorrhoids, testicular tumor, coccygeal tumor, acute osteomyelitis and carbuncles.

Blood sugar determinations were made on all twenty-four patients before, immediately after and in eight, twenty-four hours after the operation. For the control, the blood sugar was 103, 130 and 125 mg., respectively, in 100 c.c. of blood. In eighteen patients, not including the three with diabetes mellitus, the average blood sugar before operation was 123 mg., and immediately after, 156.1 mg. in 100 c.c. of blood, an average increase of 33.1 mg. In one of these, there was a decrease of 10 mg. after anesthesia, for which no explanation is offered. In eight patients, blood sugar determinations were made twenty-four hours after operation, with a return to within 13 mg. of the preoperative figure.

In the three patients with diabetes mellitus, under ethylene-oxygen for an average of twenty-seven minutes, and with a previous administration of 20 gm. of sodium bicarbonate by mouth, the blood sugar before was 280, 165 and 180 mg., and immediately after, 250, 210 and 293 mg., respectively. In the first of these there was a decrease of 30 mg., due probably to an anoxemia, resulting from a greater concentration of ethylene than was used in the other two, or, possibly, from the action of the sodium bicarbonate. However, the clinical significance of the preoperative administration of sodium bicarbonate is questioned somewhat by Morriss,[12] who made repeated observations in the study of anesthesia acidosis, therefore leaving the decrease in blood sugar in this particular patient unexplained.

The two patients receiving ethylene-ether had a preoperative blood sugar determination of 118 and 75 mg. and a postoperative of 210 and 107.5 mg., respectively, the latter in advanced jaundice from a common bile duct obstruction by a carcinoma of the head of the pancreas; for the former, no explanation is offered for the marked increase, unless it is the combined action of ethylene and ether.

By way of comparison, Epstein and Aschner,[13] studying the blood sugar changes in sixty-five patients under gas-ether anesthesia, found an average increase of 45 mg.; in another series of five patients, under nitrous oxid for an average of twenty-one minutes, there was an average increase of 27 mg. Using Bang's method for blood sugar determination, Chantraine,[14] in six patients under ether anesthesia, found an average increase of 45.5 mg., and in another patient, under ether for two hours, an increase of 83 mg.; while Dewes [15] reported the increase for six ether patients as 67 mg.

Unfortunately, we were unable to find in the literature any references to similar changes with chloroform anesthesia, for purposes of comparison. However, from the foregoing figures, the blood sugar increase is distinctly less with ethylene-oxygen anesthesia than with ether, but slightly higher than that obtained with nitrous oxid. This last variation may be due, in a measure, to a longer administration of ethylene-oxygen (thirty-two minutes) than of the nitrous oxid (twenty-one minutes).

The plasma carbon dioxid combining power of the blood was studied in fifteen persons between the ages of 22 and 62 years who received ethylene-oxygen for an average of thirty-eight minutes, including the control. The control figures were as follows: 51.3 c.c.

6. Kretschmer, H. L.: Ethylene Anesthesia in Genito-Urinary Surgery, J. Urol. 11: 415 (April) 1924.
7. Heaney, N. S.: Ethylene-Oxygen Anesthesia in Obstetrics and Gynecology, Surg., Gynec. & Obst. 38: 692 (May) 1924.
8. Lundy, J. S.: Ethylene-Oxygen as an Anesthetic for Infants, J. A. M. A. 82: 448 (Feb. 9) 1924.
9. Leake, C. D., and Hertzman, A. B.: Blood Reactions in Ethylene and Nitrous Oxid Anesthesia, J. A. M. A. 82: 1162 (April 12) 1924.
10. Van Slyke, D. D.: A Method for the Determination of Carbon Dioxide and Carbonates in Solution, J. Biol. Chem. 30: 347 (June) 1917.
11. Folin, O., and Wu, H.: A System of Blood Analysis, J. Biol. Chem. 38: 81 (May) 1919; A Simplified and Improved Method for Determination of Sugar, ibid. 41: 367 (March) 1920.
12. Morriss, W. H.: The Prophylaxis of Anesthesia Acidosis, J. A. M. A. 68: 1391 (May 12) 1917.
13. Epstein, A. A., and Aschner, P. W.: The Effect of Surgical Procedures on the Blood Sugar Content, J. Biol. Chem. 28: 151 (May) 1916.
14. Chantraine, H.: Blutzuckeruntersuchungen bei Narkose und Nervenerkrankheiten, Zentralbl. f. inn. Med. 41: 521 (July 24) 1920.
15. Dewes, H.: Ueber Blutzuckeruntersuchungen bei Operationen in Lokalanesthesia und Aethernarkose, Arch. f. klin. Chir. 122: 173, 1922.

before, 47 immediately after, and 50.4 twenty-four hours after, an almost complete return to the normal in twenty-four hours. Two patients of this series had diabetes mellitus and were under ethylene-oxygen anesthesia for twenty and forty-five minutes, respectively, with a corresponding plasma carbon dioxid of 55 and 56.2 c.c. before and 48.9 and 48.5 immediately after, with a respective difference of 6.1 and 7.7 c.c. The remaining twelve patients, with no complicating disease, were under ethylene-oxygen for an average of thirty-four minutes, with an average decrease of 3.6 c.c., the average before operation being 48.8 and immediately after 45.2.

Using ether anesthesia in sixty patients, Reimann and Bloom [16] found an average decrease in the plasma carbon dioxid combining of 15.5 c.c.; Morris, an average decrease of 8.26 c.c. in ten patients; while Caldwell and Cleveland,[17] in patients without complicating disease other than that requiring the operation, found the following: in forty-two gas-ether patients, an average decrease of 8.26 c.c.; in thirteen with ether alone, a decrease of 7.7 c.c.; in fourteen with gas-oxygen, a decrease of 4.1 c.c., and in twelve with chloroform also, a decrease of 4.1 c.c. Finally, Short [18] found an average decrease of 8.2 c.c. in twelve patients under ether anesthesia for an average of forty-eight minutes.

Except in the two patients with a complicating diabetes mellitus, the decrease in the alkali reserve under ethylene anesthesia was in every instance less than that found by the investigators mentioned whose studies concerned ether, chloroform and nitrous oxid.

We found the nonprotein nitrogenous constituents of the blood during ethylene-oxygen anesthesia practically unchanged. This was also true of the two patients receiving ethylene-ether.

Urea determinations were made on ten persons (one a control), two of them having diabetes mellitus. In the control, there was an increase of 8 mg. in 100 cc. of blood; in each of two patients an increase of 6 and 3 mg.; in three, two of whom had diabetes, an increase of 1 mg.; in one, a decrease of 1 mg., and in two, no change. Of the two patients receiving ethylene-ether, there was an increase of 5 mg. in one and a decrease of 7 mg. in the other.

Variations quite similar occurred in nine patients, relative to the uric acid content of the blood, with ethylene-oxygen anesthesia. In the control there was a decrease of 0.3 mg.; of the nine patients, four had an average increase of 0.32 mg., four an average decrease of 0.17 mg., and one remained unchanged.

The creatinin content of the blood in the control was 0.05 mg. less after than before ethylene-oxygen anesthesia; and of the eight patients, three had an average increase of 0.07 mg., four a decrease of 0.1 mg., and one remained unchanged.

Finally, the nonprotein nitrogen of the blood in the control was 1 mg. more after than before anesthesia. Of the six patients under ethylene-oxygen for an average of thirty-seven minutes, five had an average increase of 4.5 mg., and one a decrease of 5 mg.

Estimates of the changes in human blood due to other general anesthetics we have not found in the literature for purposes of comparison. However, Atkinson and Ets,[19] working with seventeen dogs anesthetized with ether for two hours, some as often as six times in twenty days, found an increase of 1.5 mg. in urea in 100 c.c. of blood; of 0.24 mg. in creatinin, and of 1.5 mg. in the total nonprotein nitrogen. At any rate, the changes in the nonprotein nitrogenous constituents of the blood following ethylene-oxygen anesthesia are so slight and inconstant that they possess no clinical significance.

Changes in the blood pressure, as a rule, were slight. At the beginning of anesthesia with ethylene-oxygen, there usually occurred a slight rise (from 5 to 20 mm. of mercury) depending, apparently very largely, on a willingness of the patient to cooperate with the anesthetist. Without cooperation, the blood pressure usually rose, because of a stage of mild excitement. After complete anesthesia, the blood pressure gradually receded to normal, and in operations of from forty-five minutes to an hour, there was in some instances a fall of from 1 to 5 mm. toward the end of the operation. During emesis or when the operator explored regions where the deep reflexes had not been abolished, a rise in blood pressure was observed, but seldom more than 25 mm. König [20] found in 100 anesthesias with chloroform and ether a rise of from 20 to 35 mm. of mercury during the excitement stage. After anesthesia was obtained, he found the fall more rapid with chloroform than with ether, but in both the fall paralleled the length of anesthesia.

In our observations all the changes in blood pressure could easily be accounted for; and in the hands of an experienced anesthetist and the patient in the hands of a capable surgeon, the blood pressure changes with ethylene-oxygen anesthesia come more nearly simulating the blood pressure changes in physiologic sleep than with any other general anesthetic.

SUMMARY

1. From clinical observations, ethylene-oxygen in the hands of trained anesthetists merits equal recognition with the other general anesthetics, having been successfully employed in more than 2,000 operations at the Presbyterian Hospital.

2. The increase in blood sugar and decrease in alkali reserve, we found, are less with ethylene-oxygen anesthesia than with ether, chloroform or nitrous oxid, except for the one instance of a less altered blood sugar content in nitrous oxid anesthesia.

3. At no time in uncomplicated conditions did the change in blood sugar and alkali reserve approach a dangerous level in these observations.

4. No very definite statement regarding the changes in blood sugar content and alkali reserve with ethylene-ether anesthesia is possible at this time; but from the two patients studied, the indications are that they will be greater than with ethylene-oxygen anesthesia.

5. The changes in the nonprotein nitrogenous constituents of the blood are insignificant and within perfectly normal variations.

6. The changes in blood pressure produced by ethylene-oxygen anesthesia are much more like those of normal sleep than are those which occur with the anesthesia brought about by ether, chloroform or nitrous oxid.

16. Reimann, S. P., and Bloom, G. H.: The Decreased Plasma Bicarbonate During Anesthesia and Its Cause, J. Biol. Chem. 30: 211 (Oct.) 1918.

17. Caldwell, G. A., and Cleveland, M.: Observations on the Relation of Acidosis to Anesthesia, Surg., Gynec. & Obst. 25: 22 (July) 1917.

18. Short, J. J.: The Formation of Acetone Bodies Following Ether Anesthesia and Their Relation to the Plasma Bicarbonate, J. Biol. Chem. 41: 503 (April) 1920.

19. Atkinson, H. V., and Ets, H. N.: Chemical Changes of Blood Under Influence of Drugs: Ether, J. Biol. Chem. 59: 5 (May) 1922.

20. König, F.: Ueber Aenderungen des Blutdrucks durch operative Eingriffe, Deutsch. Ztschr. f. Chir. 178: 187, 1923.

Clinical Notes, Suggestions, and New Instruments

A RARE COMPLICATION OF ACUTE APPENDICITIS

T. L. DEAVOR, M.D., SYRACUSE, N. Y.

A careful search of the literature failed to reveal a record of any case similar to the one here reported. In several thousand celiotomies for diseased appendix and other abdominal and pelvic conditions, I have never encountered a like complication.

Mrs. G. V. S., aged 29, rather stout, regular every twenty-eight days, never pregnant, usually quite well, with the exception of a painful right ovary associated with complete retroversion, treated surgically about three years before, was referred by Dr. Frederick S. George, Feb. 14, 1924. The diagnosis of acute appendicitis had already been made, and was very clear, there being no doubt from the symptoms and physical signs. The patient had been ill thirty-six hours, and had vomited several times. The temperature was 101.8 F.; the pulse, 120; and the pain, which was very severe, was localized over the ileocecal region, where tenderness and rigidity were easily made out. Vaginal examination showed tenderness and resistance in the right vault, but no mass anywhere. The uterus was in the midway position. The leukocyte count was 14,000. The urine was acid, with a specific gravity of 1.017, and the analysis was negative as to albumin, sugar, blood or casts.

The patient was taken at once to the Onondaga General Hospital, prepared, and operated on through a median incision, under ether given by Dr. George. A short gangrenous appendix was found, lying free in a cavity of pus, surrounded by adherent coils of intestine. Removal was difficult. The pus was withdrawn by suction, and the cavity and entire field were cleansed with sponges, wrung out of 2 per cent. chloramin-T solution. A drain was carried down to the postcecal region, to the right kidney pouch and to the pelvic cavity, and the wound securely closed. There was colon bacillus infection.

Before the appendix was explored, we were able to determine that the Baldy-Webster operation, with excision of the right ovary, done three years before, had resulted very favorably, the uterus being in good position and the pelvic cavity free, aside from a few adhesions about the left broad ligament.

Convalescence was rather stormy. The pulse remained rapid for twenty-one days, ranging from 120 to 136. The temperature varied between 99 and 103.8 F. At times there was marked abdominal distention, with severe colic pain, but eventually this all disappeared. The wound drained very freely for more than six weeks, but finally healed with no apparent weakness of the abdominal wall. The patient is very well today.

SYMMETRICAL GANGRENE OF THE NATES

At the end of the fourth week, without any particular premonitory symptom, there suddenly appeared on the inner aspect of the nates of the right side a circular spot of gangrene about the size of a dime. There was tenderness but no severe pain. There was no leukorrhea, and the urine contained no irritating properties. Inside of ten hours, a second spot of gangrene formed on the nates, exactly opposite the first and in every way symmetrical with it. The darkened area on each side enlarged rapidly in all directions until, at the end of forty-eight hours, the diameter of each diseased section measured about 3½ inches (9 cm.). Very soon, by coalescence, the entire perineum was involved, the destructive process burrowing deeply between the rectum and vagina. The temperature and pulse were both noticeably increased, there was a slight chill, and the patient appeared septic. The characteristic odor was perceptible. On the sixth day, the line of demarcation was definitely reached, and softening began to take place. Two days later, we were able easily to extract a soggy, wedge-shaped mass from each side, which had the appearance of connective tissue and fat interspersed with blood vessels. This left a huge cavity, extending well upward under the vagina, and laterally into each ischiorectal fossa. The rectum was laid bare for at least 2½ inches (6.3 cm.). The floor of the vagina was not perforated, and there was no fecal incontinence, although the external sphincter must have been almost completely destroyed. A rectal tube was fixed in place for two weeks, and daily antiseptic dressings applied, chloramin-T and boric acid packs being used alternately. The pulse and temperature soon dropped to normal, and the healing process, though slow, was at last very satisfactory. A true etiology could not be established.

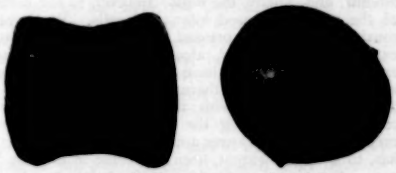
The case seemed unusually interesting, and a bit out of the ordinary. The sudden onset of gangrene, with rapid destruction of the entire perineum, exposing a large portion of the rectum was, really, no less remarkable than the rapid and complete expulsion of all diseased tissue *en masse*, followed by restitution and an almost perfect cosmetic result, with little or no disturbance of function.

AN UNUSUALLY LARGE GALLSTONE PASSED BY RECTUM

A. J. GORDON, M.D., NEWARK, N. J.
Assistant Attending Gynecologist, Newark City Hospital

Large gallstones are often found at operation, but one seldom sees an exceedingly large stone passed by rectum. The stone shown in the accompanying illustration was passed by a woman, aged 58, who had had typical attacks of gallstone colic about nine years previously.

When first seen the patient complained of a dull pain in the "pit of her stomach," also in the lower part of her chest posteriorly. The pain at times became quite severe, occasionally colicky in nature, but not radiating upward toward the shoulder on the right side as it did in the attacks nine years before. Constipation was also complained of.



Appearance of gallstone from two points of view.

On physical examination it was noted that the skin was deeply jaundiced, as were the sclerae of the eyes. The gallbladder was easily palpable and tender to the touch, and slight rigidity was present in the gallbladder region. The patient's rectal temperature when I first saw her was 98.8. She had been ill for three or four days. Operation was suggested but refused. I prescribed calomel and enemas to secure complete evacuation of the bowel. Turpentine stupes were to be applied and turpentine enemas to be given in case of abdominal distention. Olive oil in half pint doses every morning was also ordered, with 10 grains (0.65 gm.) of sodium salicylate and 15 grains (1 gm.) of sodium bicarbonate three times a day. The patient was also advised to take a dose of her favorite salts every morning.

The patient gradually improved, and I did not see her until a month later, when she came to my office with a large gallstone, which she had passed by rectum. She stated that it had given her terrific pain while passing down the rectum, and when the stone was about an inch or two distant from the anal orifice the pain was so unbearable that she had to insert her finger in the rectum and deliver the stone in this way herself. The stone weighed 139 grains (9 gm.), was more or less barrel-shaped, and was about 1 inch (2.5 cm.) long, 3 inches (7.5 cm.) in circumference, and three-fourths inch (2 cm.) in diameter. The shape of the ends of the stone shows that it had been in contact with other stones, and I have heard since from the patient that she has passed several small stones also by rectum.

[NOTE.—The stone submitted was found, on examination by the American Medical Association Chemical Laboratory to be a typical gallstone of unusual size.—ED.]

Special Article

GLANDULAR THERAPY

[NOTE.—The following articles complete the series on Glandular Therapy, which began in the issue of September 27. This series will now be collected and published in book form, bound in cloth. The book will contain over 100 pages, and will be available at 75 cents. Address: American Medical Association, 535 North Dearborn Street, Chicago.—ED.]

THE PHARMACOLOGY OF OVARIAN PREPARATIONS

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ANN ARBOR, MICH.

Our knowledge of the action of extracts of the ovaries is in a highly unsatisfactory condition, although recently some progress has been made in solving some of the problems in connection therewith. The difficulties connected with the work are not hard to understand. In the first place, the ovary contains more than one structure which might be capable of elaborating a hormone. We have to consider the ovary as an entity; also the corpus luteum or the ovary without the corpus luteum; and, finally, the liquor folliculi, to say nothing of the much discussed interstitial cells. We have to consider the juices expressed from the ovary or watery extracts of the ovary, alcoholic extracts and lipoid extracts—all of which have been employed in experimental work. Finally, there has been until recently the difficulty connected with the obtaining of accurate criteria for measuring the activity of these various preparations on the lower animals. The latter difficulty has, to a certain extent, been overcome in the last few years, thus giving an opportunity for a definite advance. Another cause for confusion has resulted from the fact that some of the investigators have not controlled the administration of ovarian extracts by injecting extracts of other organs and tissues under comparable conditions. Doubtless, some of the effects that are said to be specific for the ovary are common to extracts made from other organs.

OVARY

The expressed juices or extracts of the ovary, when injected into animals, produce certain changes that seem to be pretty definitely established. The most important of these is perhaps the hyperemia of the genitalia and thickening of the uterine mucosa. The changes simulate those seen in natural heat. The feeding of ovaries is said also to prevent the atrophy of the mammary glands and to raise oxidation in the castrated animal, although this is denied.

It is stated also that it produces an increase in the secretion of the posterior lobe of the pituitary.

Finally, it is said to inhibit coagulation of the blood, the corpus luteum not possessing this property.

Changes in the general blood pressure, in the way both of an increase and of a decrease, have also been described, but the question is raised as to whether the latter changes on the coagulation of the blood and on the blood pressure, so far as they do actually occur, are specific for the ovary or whether they are not common to extracts of all organs.

CORPUS LUTEUM

Extracts of the corpus luteum have been reported to produce hypertrophy of the mammary glands and apparently also to possess a galactagogue action; although in the experiments of Ott and Scott, extracts of other organs possessed a like action. According to Loeb,[1] it would seem that the typical effects of the corpus luteum in inhibiting ovulation have not been reproduced in animals, but Pearl and Surface did find that a dried, fat free extract of the cow's corpus luteum would inhibit ovulation in a laying fowl, and that when the injections were stopped, ovulation and laying began again. Such extracts also produce circulatory effects on the genital organs; and atrophy following castration can perhaps be avoided; but these results, too, may not be specific.

LIQUOR FOLLICULI

An important advance has been made in the last few years in demonstrating the fact that certain specific effects are produced in animals by the administration of the liquor folliculi. Frank,[2] in 1922, reported experiments, which he had carried out in 1917, in which he had injected follicular fluid into virgin rabbits with the result that in all the animals well marked hyperplasia of the uterus was noted. In 1923, Allen and Doisy[3] reported that liquor from hog ovaries produced in spayed animals typical estrual hyperemia, growth and hypersecretion in the genital tract and growth in the mammary glands. These changes included thickening and cornification in the vaginal walls. The animals exhibited typical mating instincts. The findings of Frank and of Allen and Doisy are of great importance, as they seem to demonstrate a definite hormone in the liquor folliculi, and it may well be questioned whether or not some of the contradictory results that appear in the literature, especially as regards the effects of the ovarian extracts, may not be explained by the fact that such extracts would contain varying amounts of the liquor or, perhaps, under certain conditions, none whatever. In the light of this work, it would seem that a further examination of the action of extracts of the ovaries is indicated.

OVARIAN THERAPY

EMIL NOVAK, M.D.
BALTIMORE

The known facts as to the function of the ovary are sufficient to supply a rational basis for ovarian therapy in certain indications. Especially important in this connection is the study of the phenomena produced by complete removal of ovarian tissue, such as the cessation of menstruation, the frequent appearance of troublesome subjective symptoms similar to those of the natural menopause, and the occurrence of certain metabolic changes. The obvious suggestion derived from such observations is that clinical symptoms thought to be due to ovarian deficiency might be cured or relieved by administering some form of ovarian substance. This fundamental idea has been subjected to some refinement as a result of studies aiming to stress some one or other of the ovarian constituents as the source of the active principle. Based on such investigations, several forms of ovarian therapy have developed, including the administration of whole ovary substance, of corpus luteum extract alone, and of the so-called ovarian residue.

1. Loeb, Leo: Surg. Gynec. & Obst. 25:300 (Sept.) 1917.
2. Frank, R. T.: The Ovary and the Endocrinologist, J. A. M. A. 78:181 (Jan. 21) 1922.
3. Allen, Edgar; and Doisy, E. A.: An Ovarian Hormone, J. A. M. A. 81:819 (Sept. 8) 1923.

The first serious attempts at ovarian therapy were made in 1896 at the Landau clinic in Berlin, the preparation used being the fresh ovarian substance obtained from the cow or sow. Fraenkel, the foster father of the corpus luteum theory of menstruation, is responsible also for the use of the corpus luteum extract, which he employed in a small series of cases. The paper of Burnam, in 1904, did much to popularize this form of therapy. A third preparation was suggested by Graves, in 1919. It is obtained from that portion of the ovary remaining after removal of the corpus luteum. The study of the pharmacodynamics of the various forms of ovarian extract has until recent years yielded unimpressive results as regards the generative system. The most important fact gleaned has been that, in general, watery extracts are comparatively inert, and that the activity of the ovarian principle is in some way bound up with the lipoid content of the ovary. This point has a practical bearing in that it is a strong argument against the degreasing that is so often a step in the process of preparation of the commercial extracts. The recent work of Allen and Doisy indicates that the follicular fluid may contain a principle which, on injection into animals, causes estrus-like changes somewhat similar to those obtained by Hermann with the corpus luteum lipoids. There is as yet no justification, however, in assuming that this specific principle is found only in the follicles.

The commercial preparations available are extracts of the whole ovary, corpus luteum extracts and the ovarian residue. All these are procurable in the form of tablets, capsules, powder or watery solutions (in ampules). The last named are probably inert, if the observations quoted above are correct, and yet they have achieved an enormous vogue. Of the other forms, it is difficult to outline indications for preference of whole ovary over corpus luteum, or vice versa. If any rule is possible, it would perhaps be that whole ovary is the more rational in developmental disorders of ovarian origin, while corpus luteum extract is perhaps more desirable in those disturbances revolving about the menstrual function. The theory for the employment of ovarian residue is not convincing, and its use is not by any means as general as that of the other two. The watery extracts so widely used for hypodermic administration are probably inert, according to the best evidence available. Any good results obtained from their use are probably due either to the psychic factor or to the presence of protein factors that stimulate glandular structures generally, in accordance with the modern theory of protein therapy. Finally, with regard to the administration of ovarian extracts by mouth, there is always the possibility that, like many other extracts, their activity is destroyed by the digestive juices.

CONDITIONS IN WHICH OVARIAN THERAPY HAS BEEN USED

Functional Amenorrhea, Especially in Association with Adiposogenital Dystrophy.—Here the indications are theoretically good, but the results are not very striking, even when combined with thyroid or pituitary extracts, as is usually done. And yet ovarian therapy is here more rational and much safer than the various so-called emmenagogue drugs, such as manganese or the vegetable oils. Ovarian therapy should not be used until the physician is satisfied that the amenorrhea is not, as is so often the case, a mere symptom of incipient tuberculosis, anemia, or other systemic diseases.

Menopausal Vasomotor Symptoms.—Authors are almost unanimous in ascribing some virtue to ovarian therapy for this indication. Corpus luteum extracts are used perhaps more generally than those of the whole ovary. They appear to give some relief from the hot flushes, the heat flashes, the vertigo and the headache of the menopause. Often, on the other hand, they fail to help. There is some risk in drawing conclusions where one is dealing with such purely subjective symptoms, but the evidence of therapeutic value is less unconvincing with this than with any of the other indications for ovarian therapy.

Uterine Hemorrhage.—While a few writers report good results from ovarian therapy in certain forms of hemorrhage (especially the so-called functional hemorrhage of the menopause), this form of medication cannot be looked on as offering very much hope of success—certainly no more than that offered by treatment with thyroid or posterior pituitary extracts. It should not be employed until after the diagnostic elimination of organic pelvic disease, especially cancer.

Dysmenorrhea and Genital Hypoplasia (infantilism, etc.).—The only type of dysmenorrhea in which, even theoretically, organotherapy would seem to be indicated is the so-called primary dysmenorrhea. This is commonly associated with varying degrees of underdevelopment of the uterus. This uterine hypoplasia is almost surely due to an endocrine defect of some form, although its exact nature is not known. Deficiency of the ovarian secretion is believed by many to be a factor, either primary or secondary, in this syndrome, and hence ovarian products are often used for its correction. Here, again, there is an obvious element of empiricism, and hence it is not surprising that the results are anything but impressive.

Sterility.—What has been said of dysmenorrhea may be said of sterility. When combined with developmental deficiency of the uterus, organotherapy is a rational method of treatment. A few reports of good results are to be found in the literature (Fallenberg, Solomons), but far more frequently the results are disappointing. The essential importance of excluding the more common causes of sterility (inflammatory or other obstructions in one part or another of the genital tract, the male factor, etc.) need scarcely be emphasized.

Obesity of Hypogenital Origin.—This symptom is most often noted at the menopause, either natural or surgical. Certainly the administration of ovarian extracts for this indication is based on good grounds, and yet the results are not very striking, unless these extracts are combined with thyroid, in which case the latter is undoubtedly the potent agent.

Vomiting of Pregnancy.—This indication would not be entitled to the dignity of separate mention except that the hypodermic employment of corpus luteum extract for this symptom has achieved considerable vogue because of the recent publications of Hirst. The reasons given by this author for the form of treatment are speculative and illogical. When the method has been properly controlled, as in the study of King at the New Orleans clinic, the results claimed by Hirst have not been confirmed. Moreover, it is probable, as already stated, that the watery solutions used for hypodermic medication are inert. This method of treatment is a good illustration of organotherapy of the less desirable sort.

Other Alleged Indications.—One need only mention a list of indications for which ovarian therapy has been employed by various enthusiasts, usually without reason

and almost always without result, viz., repeated abortions, uterine fibroids, exophthalmic goiter, deficient mammary secretion, epilepsy, pruritus vulvae, etc. It may safely be said that no patient with any of the foregoing disorders will suffer from the omission of ovarian organotherapy.

CONCLUSION

It may again be emphasized that, rational as ovarian therapy appears to be in some conditions, the results are rarely striking and often nil to the level-headed observer. It cannot be assumed that a commercial extract can replace the normal ovarian secretion in the patient's body, or, for that matter, that it originally contains any of the active hormones of the ovary. Here lies the crux of the whole problem, whose solution will depend in large measure on the work of the biochemist. Until this day, the physician who uses ovarian therapy should keep his feet on the ground and not let himself be carried away by the exaggerated claims of those who have something to sell, or the ill advised and premature reports of honest but deluded professional colleagues who have not yet learned the dangers lurking in the "post hoc propter hoc" method of reasoning. As I once heard a wise man say, "Ought we to assume, if the administration of cascara relieves constipation, that the constipated individual had been a victim of hypocascarism?" There can be little question as to the future importance of ovarian therapy—as regards its present importance there is considerable room for discussion.

MAMMARY GLAND PREPARATIONS

W. A. PUCKNER, PHAR.D.
Secretary, Council on Pharmacy and Chemistry of the American Medical Association
CHICAGO

Mammary gland preparations were admitted to New and Nonofficial Remedies when there was promise that they might be found to have therapeutic value. In 1921, the Council considered the question of continuing these products in New and Nonofficial Remedies. In view of the slight evidence for the therapeutic value that had accumulated during the many years of their trial, the Council decided to omit these preparations from the book.[1]

To determine whether the status of these products had changed, letters were written to a number of men who might be expected to be conversant with the present status of therapy with mammary gland preparations. Great difficulty was encountered in finding any medical men of standing who would undertake to write on the subject. The appeal was made to a leading gynecologist, a leading obstetrician, a leading pharmacologist and a man closely identified with the field of internal secretions. Answers such as the following were received:

To be very frank, I am quite unfamiliar with any benefits derived from the use of mammary gland preparations.

I do not know of one single piece of scientific work justifying the use of mammary gland preparations.

I beg to state that it is my opinion that there is available too little scientifically valid evidence on the problem to justify a report at this time.

Yesterday, I brought the subject up at the surgical staff meeting, where nearly every man connected with the surgical staff of this hospital was present and no one knew anything in favor of mammary gland therapy.

These reports indicate that there is no clear-cut evidence to show that the administration of mammary gland preparations is of value; therefore the Council gave up the project of having an article on mammary gland preparations included in this series.

1. Reports of Council on Pharmacy and Chemistry, 1921, p. 44.

New and Nonofficial Remedies

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

W. A. PUCKNER, SECRETARY.

HEXYLRESORCINOL ("CAPROKOL")

Preliminary Report of the Council on Pharmacy and Chemistry

The Council has authorized publication of the following statement on the experimental status of hexylresorcinol.

W. A. PUCKNER, Secretary.

Hexylresorcinol is a new resorcinol derivative proposed for use as a urinary antiseptic. So far, the only evidence for the therapeutic usefulness of hexylresorcinol is contained in a paper by Dr. Veader Leonard[1] of the Department of Bacteriology of the School of Hygiene and Public Health, Johns Hopkins University, "Secretion of Bactericidal Urine and Disinfection of the Urinary Tract Following Oral Administration of Certain Alkyl Derivatives of Resorcinol." This paper contains observations on the effects of hexylresorcinol on rabbits, on normal man and in clinical cases of infection of the urinary tract.

The lower homologues of a series of alkyl resorcinols were synthesized by Johnson in 1913, and Rettger, testing their bactericidal properties, found a rapid increase in the phenol coefficient as the series was ascended. Leonard later discovered that alkylation of resorcinol decreases its toxicity and at the same time increases its bactericidal power in direct proportion to the sum of the atomic weights of the atoms in the side chain. The greatest bactericidal effect is reached in normal hexylresorcinol, which has a phenol coefficient of 46. The alkyl resorcinols are said to be among the most powerful organic germicides ever described as possessing anything like its degree of nontoxicity to animals and to man.

Tests of the bactericidal action of hexylresorcinol in normal urine were made by inoculating the urine with strains of *Bacillus coli* and *Staphylococcus albus* from cases of pyelitis, and it was found that the organisms were destroyed in dilutions of 1:10,000 and upward in both acid and alkaline urines. The bactericidal action in alkaline mediums thus constitutes a great advantage over hexamethylenamin. Tests of toxicity demonstrated that the drug is not toxic for rabbits in large single doses (from 1 to 2.5 gm.) or in daily doses of 0.5 gm. given over a period of three weeks. Similar tests in five normal men showed that a 25 per cent. solution in olive oil administered in doses of from 0.13 to 0.68 gm. in gelatin capsules, three times a day, on six days in the week, for six consecutive weeks, produced no important toxic effects. One subject experienced nausea when taking the solution in 50 per cent. concentration on an empty stomach, and in two subjects the drug had a cathartic action, which disappeared in two or three days in spite of increased dosage. The expectancy of bactericidal urine, following oral administration in rabbits, rose during the first hour to 53 per cent., in the second hour to 75 per cent., and in the third hour to 92 per cent.; and at from eighteen to twenty-eight hours after administration, 56 per cent. of the specimens were bactericidal.

The administration of from 0.25 to 0.5 gm. of hexylresorcinol, three times a day, to five normal men caused the secretion of a urine which kills *Bacillus coli* and *Staphylococcus albus*, but there was considerable variation in the dosage necessary to produce a bactericidal urine in different individuals, and some variation in the dosage necessary in the same individual at different times. Thus, the expectancy of

1. This issue, p. 2005.

a bactericidal urine under similar circumstances varied from 30 per cent. in one normal man to 81 per cent. in another. In general, the curve of expectancy of bactericidal urine parallels that in rabbits, rising to 63 per cent. between the first and third hour, 66 per cent. from the third to the fifth hour, 75 per cent. from the sixth to the eighth hour, and dropping only to 45 per cent. between the fifteenth and twentieth hours. There is thus the possibility of obtaining a continuous flow of bactericidal urine. Curiously enough, the administration of large doses of sodium bicarbonate with the hexylresorcinol causes the production of an inert urine even though the titration of an acid bactericidal urine to alkalinity (*Ph* 8) with normal potassium hydroxid solution did not destroy the bactericidal action.

Dr. Leonard reports in detail the treatment of nine cases of chronic urinary tract infection in adults, usually without treatment other than hexylresorcinol. Urinary infections due to *Staphylococcus aureus, Streptococcus anhemolyticus* and *Bacillus pyocyaneus* (most strains) were promptly cured, and there was no recurrence after discontinuance of treatment. On the other hand, infections with *Bacillus coli*, while often cleared up completely if the bacterial count is not high, were frequently not entirely relieved when the infection was heavy and the bacterial count was not temporarily reduced by some other means. There may be decided symptomatic improvement, however, in spite of incomplete disinfection. In the clinical cases treated, the dosage was from 0.33 to 1 gm. three times a day, administered in "enteric coated capsules." A large part of each dose is excreted in the urine in an inert form as a conjugate. For this reason large doses, such as from 1 to 2 gm. a day, are necessary in order to obtain effective bactericidal action.

The clinical cases, although few in number (nine), give evidence that the drug gives promise of acting satisfactorily as a urinary disinfectant. On account of the strong bactericidal action in either acid or alkaline urine, the rapid and continuous excretion over a considerable period of time following oral administration, and its low toxicity, hexylresorcinol gives promise of proving a useful disinfectant of the urinary tract. The evidence as to the value of the drug is as yet limited to the report of Dr. Leonard, and confirmation of this work must be awaited before the usefulness of hexylresorcinol can be estimated.

A preparation of hexylresorcinol will be marketed by Sharp and Dohme as "Hexyl-Resorcinol-S. & D.," or "Caprokol," in the form of pills which contain 0.15 gm. of the substance. The drug, as employed by Dr. Leonard, however, differs from the commercial product that will be marketed in that the bulk of his clinical results were obtained with crystals of hexylresorcinol enclosed in hard gelatin capsules coated with phenyl salicylate. Sharp and Dohme endeavored to put up Hexyl-Resorcinol-S. & D. in enteric coated gelatin capsules, but this was found to be unsatisfactory on a large scale. The firm has now devised a chocolate covered pill containing the drug in a mixture resembling dextrinized starch. According to tests conducted in the A. M. A. Chemical Laboratory, this pill is not disintegrated by artificial gastric or by artificial intestinal fluids at 40 C., but becomes very soft and pasty in either medium; hence, it is a question just how much of the hexylresorcinol becomes available, respectively, in the stomach and the intestine (where absorption takes place).

Hexylresorcinol will be eligible for New and Nonofficial Remedies if its therapeutic usefulness is established by clinical trials confirmatory of the findings of Dr. Leonard; in that case Hexyl-Resorcinol-S. & D. ("Caprokol") will be accepted if the form in which it is marketed is found satisfactory and the advertising claims acceptable.

NOVASUROL.—The double salt of sodium mercurichlorphenyl oxyacetate with diethylbarbituric acid (barbital). — $(NaOOCCH_2O).ClC_6H_3.Hg[CO.NHCO.C(C_2H_5)_2.CONH]$.

Novasurol contains 33.9 per cent. of mercury.

Actions and Uses.—Novasurol was introduced originally as an antisyphilitic, but seems to be used chiefly as a diuretic. It has the advantage over mild mercurous chloride and other insoluble mercury compounds in that it is soluble and may be administered by intramuscular or intravenous injection. The best results have been obtained in dropsies due to cardiac disease; it is said to succeed in cases in which the purin derivatives and digitalis have failed. It seems to have been useful in some cases of edema of renal origin, but, in general, nephritis is a contraindication. It is usually ineffective in edema due to cirrhosis of the liver, and may be harmful. Some authors, although highly recommending soluble mercury compounds as diuretics, state that they should be used only as a last resort, when other drugs have failed.

As an antisyphilitic, novasurol has generally been injected intravenously mixed with one of the arsphenamines; this is considered by some to be the most satisfactory method of obtaining the combined action of arsenic and mercury. It is recommended, however, that this treatment be followed by the administration of mercury by one of the usual methods.

Dosage.—The dose as a diuretic ranges from 1 to 2 Cc. of the 10 per cent. solution injected intramuscularly or intravenously. It is recommended that 0.75 Cc. be given first, in order to determine the patient's tolerance for mercury. If the drug is well borne, the dose can be increased to 1 Cc. or up to 2 Cc., according to the effect observed. The drug is given once or twice a week. Digitalis may be given as indicated.

The injections are said to be painless usually, or at least the pain and discomfort are slight and transient; induration at the site of injection is said to be of rare occurrence and of short duration.

The initial dose as an antisyphilitic is 0.75 Cc. or 1 Cc. of the 10 per cent. solution injected intramuscularly once or twice weekly; later the dose may be increased to 2 Cc. Recently it has been administered with arsphenamine; 1 Cc. of the 10 per cent. solution of the drug being mixed with a dose of the arsphenamine and injected intravenously; this was repeated about every five days for eight times.

Manufactured by The Bayer Company, Inc., Rensselaer, N. Y. (Winthrop Chemical Company, New York, distributor). U. S. patents 1,034,092 (July 30, 1912; expires 1929) and 1,074,781 (Oct. 7, 1913; expires 1930). U. S. trademark 106,829.

Novasurol Ampules: Each ampule contains 1.2 Cc. of a 10 per cent. solution of novasurol and metacresol, 0.05 per cent.

Novasurol occurs as a white crystalline powder, odorless; soluble in cold water. The solution is slightly alkaline. Addition of strong acids to a solution of novasurol yields a precipitate consisting of diethyl barbituric acid, and the mercury derivative of chloro-phenyloxyacetic acid; on heating the solution the latter breaks up to mercuric chloride and chloro-phenyloxyacetic acid.

To 2 Cc. of a solution of novasurol (1: 1,000) add 0.1 Cc. of ferric chloride solution (1: 25); a flesh colored precipitate forms. Add ammonium sulphide solution to 10 Cc. of novasurol 5 per cent.; there is developed slowly when cold, and quickly when heated, a black discoloration of the liquid with later formation of a black precipitate of mercuric sulphide. Add 2 Cc. of sodium hydroxide solution to 5 Cc. of novasurol solution 5 per cent.; no precipitate forms. Add 1 Cc. of solution of formaldehyde and heat; metallic mercury separates from the solution.

Dry about 1 Gm. of novasurol, accurately weighed, for six hours at 100 C.; the loss in weight is not more than 2 per cent.

Transfer about 0.7 Gm. of novasurol, accurately weighed, to an Erlenmeyer flask; add 100 Cc. of water and agitate until powder has dissolved; add 15 Cc. of strong hydrochloric acid, connect to a reflux condenser and boil for three hours. Add 175 Cc. of hot water, and pass in hydrogen sulphide for fifteen minutes. (It is important that the temperature of the solution should be about 70 C. in order to keep in solution slightly soluble organic compounds formed during hydrolysis.) Filter while warm, through a Gooch crucible, wash with distilled water and finally three portions of cold alcohol and then one portion of carbon disulphide. Close the rubber tubing leading from the suction flask to the suction pump with a pinch clamp; add sufficient carbon disulphide to cover the precipitate, cover the crucible with a watch glass and allow to stand one-half hour. Then release pinch clamp, drain off solution and wash with several portions of carbon disulphide. Dry in an oven at 100 C. for four hours. Weigh the mercuric sulphide and calculate to mercury. The mercury content of the dried specimen is not less than 33 per cent. nor more than 34.5 per cent.

Place about 0.3 Gm. of novasurol, accurately weighed, in a tared platinum dish, add 10 Cc. of sulphuric acid and gently heat while fumes of sulphur trioxid are evolved. (The mercury is also volatilized.) Cool in desiccator and weigh as sodium sulphate. The sodium calculated from this determination should not be more than 4.0 per cent. nor less than 3.75 per cent.

QUININE ETHYL CARBONATE (See New and Nonofficial Remedies, 1924, p. 267).

Euquinine-N. Y. Q.—A brand of quinine ethyl carbonate-N. N. R.

Manufactured by the New York Quinine and Chemical Works, New York, by license from The Chemical Foundation, Inc. U. S. trademarks 30,696 and 54,088.

Pathology for Biologist and Philosopher.—Medical instruction has been mauled about enough for the present; I think we had better leave it alone for a while and see how our reforms work. But pathology should no longer be a purely medical subject, and courses should be available for other than medical students, first, perhaps, for the biologist, to whose subject pathology is more germane than has been realized, and then for the philosopher. It would do us teachers a deal of good to have to guide into pathology students who neither know nor intend to know any medicine; we should, I am sure, reap a good harvest of fresh ideas.—Boycott, A. E.: *Lancet* **2**:999 (Nov. 15) 1924.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, DECEMBER 20, 1924

THE PREVENTION OF CONCEPTION

In his presidential address before the American Medical Association last June, Dr. William A. Pusey [1] called attention to the necessity for scientific consideration of the problems of birth control, with particular reference to the limitation of increases in population and to the possibility of breeding for quality rather than quantity. He concluded that section of his address which referred to these problems with the statement: "I particularly desire that the mistaken impression should not go out that I mean to say that medicine now has any satisfactory program for birth control. It has not."

In an article in the *American Mercury* [2] for October, the conclusion of Dr. Pusey with regard to the medical aspects of birth control was emphasized, and it was pointed out that the economists, sociologists and philosophers who favor limitation of population seem to have no adequate or practical program for extending even such methods as are available to that portion of society which seems to require them most specifically. There has now been published additional information to support these views, particularly in a report by a committee organized under the auspices of the Academy of Medicine of New York. The Committee on Maternal Health [3] has conducted investigations in the outpatient departments of six institutions as to methods of contraception that are used and as to the success of such methods. Moreover, evidence has been assembled from such medical literature as is available, so that the report may be considered a digest of all the data thus far presented. Incidentally, these data concern the records of more than five thousand cases.

It is beyond the purpose of the present discussion to consider the various arguments for and against the now known mechanical, chemical and perhaps psychologic methods for the prevention of conception that are discussed in the report of the committee.

The conclusions indicate the need for additional research on all such methods. It is pointed out that thus far, apparently, there has been no investigation of birth control made in a scientific and ethical spirit, and approaching the subject without bias, so that, as might be expected, there is a wide divergence of opinion and a vast amount of argumentation. Questionnaires were sent to gynecologists both in America and abroad, and their opinions vary as much as those of laymen. The investigation carried on in Holland demonstrated that "this much quoted paradise of birth control is without clinics and clinical reports, or consensus of opinion." Investigations in England, Germany and Russia yielded equally unsatisfactory results. The committee concluded that the medical profession does not yet know of any guaranteed contraceptive. The significant outcome of the entire investigation is a demand for the collection of additional data under competent supervision, with the physical questions determined by properly qualified physicians.

The final statement in the report of the Committee on Maternal Welfare is the conclusion that this subject is "susceptible of handling as clean science, with dignity, decency and directness." This is emphasized particularly, since heretofore discussions on birth control have not generally been carried on in a scientific manner, but rather with argument and in a sensational tone that naturally failed to yield the results sought. In a recent discussion of the problems of population before the Royal Statistical Society in Great Britain, Mr. Udny Yule indicated the belief, based on studies by both British and American statisticians, that the growth of population [4] is "a biologically self-regulating process; indeed, a process of which the regulation is extraordinarily sensitive." While the arguments advanced do not establish the correctness of such views, they seem so satisfactory that the tendency is to believe that they are sound. In commenting on this particular phase of the matter, the *British Medical Journal* says: "A conviction has steadily grown that the advocates of conception control and their opponents are for the most part tedious writers, only to be tolerated if the views they uphold or denounce with so much vehemence are really of first-rate importance. If, on the other hand, as seems to follow from Mr. Yule's hypothesis of biological self-regulation, they are mere vocal flies upon a wheel whose turning they can neither hasten nor retard, they may safely be left to talk to one another."

In Great Britain, this subject has received more than the usual amount of attention because of the enthusiastic advocates who have kept the problem prominently before the public. It will be remembered that several official commissions have investigated the problem

1. Pusey, W. A.: Some of the Social Problems of Medicine, J. A. M. A. 82:1905 (June 14) 1924.
2. Fishbein, Morris: Birth Control—An Unsolved Problem, Am. Mercury 3:210 (Oct.) 1924.
3. Dickinson, R. L.: Contraception: A Medical Review of the Situation, Am. J. Obst. & Gynec. 8:583 (Nov.) 1924.
4. The Growth of Population, editorial, Brit. M. J. 2:1014 (Nov. 29) 1924.

from time to time. Moreover, through the intricacies of legal procedure, it has finally been brought to the attention of the House of Lords.[5] This unusual consideration before high courts resulted from numerous appeals in a libel action between Dr. Marie Stopes and Dr. Halliday Sutherland, who criticized some of her work. Although no new arguments or scientific information on the problem became available as a result of the trial, there did develop a focusing of attention on the matter, which brought out some definite facts relative to the amount of consideration given to the subject in medical schools.[6] It was pointed out that there is a general apathy among medical men on this question which, Mr. C. P. Blacker feels, is largely responsible for the general dissemination of knowledge from an emotional rather than a medical angle. Indeed, Mr. Blacker asserts that the medical schools give relatively little information to students of obstetrics as to the actual hygiene of pregnancy and parturition as they affect marital relations and the possibility of future conception. In view of the fact that such relations have a definite bearing on the incidence of sepsis, the problems are worthy of careful medical study. It is the opinion of the *Lancet* that a chapter on this matter might well be included in every volume on obstetrics, and might with advantage constitute a part of the course of instruction in this branch of medical science.

REORGANIZATION OF FEDERAL HEALTH ACTIVITIES

The bill[7] introduced into Congress at the instance of a majority of the Joint Committee on the Reorganization of the Executive Departments unfortunately does not seem to provide effective reorganization of the health activities of the Federal Government: The Children's Bureau is to remain in the Department of Labor, although the original plan included it among the bureaus to be transferred; the Division of Vital Statistics of the Bureau of the Census is to remain in the Department of Commerce, and public health activities among the Indians are still to be discharged by the Bureau of Indian Affairs, in the Department of the Interior. The Public Health Service, it is true, is to be shifted from the Treasury Department to a proposed Department of Education and Relief, but otherwise its status is to remain unchanged. So far as public health functions are concerned, therefore, little or nothing will be gained by the enactment of this bill in its present form. On the other hand, it may serve to postpone a much needed businesslike reorganization. Unless amendments in the interest of efficiency and economy in public health administration be made, the bill had better not be enacted.

The outstanding feature of the bill is the proposed creation of a new executive department, to be known as the Department of Education and Relief, under direction of a secretary, a member of the President's Cabinet. Three assistant secretaries are to be appointed: an assistant secretary for education, an assistant secretary for public health and an assistant secretary for veteran relief. The Secretary and each of the assistant secretaries is to be appointed by the President, by and with the advice and consent of the Senate. No restriction is placed on the qualifications of any of these appointees, and by reason of the method of appointment each will be subject to change with each change of administration. If ordinary official nomenclature be followed, the activities performed under the direction of each assistant secretary will constitute a "bureau," and there will be a Bureau of Public Health, in which will be organized all such health activities as may be transferred to the new department. The present Bureau of Education and certain related agencies are to constitute a Bureau of Education; and the Veterans' Bureau as it now stands, and a few offices discharging similar functions, will be organized into a Bureau for Veteran Relief, each with its own assistant secretary.

The Joint Committee itself names as the health activities that will be embodied in the new Bureau of Public Health, three agencies: the Public Health Service, now in the Treasury Department, and the St. Elizabeths Hospital and the Freedmen's Hospital, now in the Interior Department.[8] Elsewhere, however, the committee states that the hospitals named are institutions given over to the care and medical treatment of various groups of Government beneficiaries. Within the ordinary understanding of the scope of public health agencies, these hospitals, therefore, are not properly assigned to the public health group, but belong elsewhere, and the proposed Bureau of Public Health will be in fact made up of the Public Health Service alone. Even those activities of the Children's Bureau and of the Women's Bureau, now in the Department of Labor, that President Harding, after numerous conferences with the various heads of the executive branch of the Government, suggested be transferred to the proposed new department, are allowed to remain as a function of Labor.

"The Treasury Department," says the Congressional Joint Committee on Reorganization, "makes no secret of its desire to be rid of the nonfiscal functions which it now exercises, frankly acknowledging not only that they constitute a real embarrassment to the fiscal work of the department, but also that the departmental officers are not able to give the expert supervision to such diversified nonfiscal matters as represented by the Supervising Architect's office and the Public Health Service"[9]

5. See London Letter, this issue.
6. Teaching on Contraception in Medical Schools, editorial, Lancet 2:1137 (Nov. 29) 1924.
7. S. 3445, H. R. 9629, A Bill to provide for the reorganization and more effective coordination of the executive branch of the Government, to create a Department of Education and Relief, and for other purposes.
8. Senate Doc. No. 128, 68th Congress, 1st Session, page 15.
9. Ibid., page 10.

This, however, is hardly sufficient to account for the transfer of the Public Health Service from the Treasury Department to the proposed Department of Education and Relief. Certainly, the transfer of the Public Health Service is not proposed to provide more expert supervision; for no provision for any such supervision is made in the organization of the projected department. And if, notwithstanding that the Service has been developed under the auspices of and as an integral part of the Treasury Department, the activities of the Service are so highly technical that that department is unable to adjust itself to them even yet, it seems unreasonable to expect that a new department, as devoid of any special facilities for supervision and control as is the Treasury Department, will take over the task with any hope of better success. Incidentally, if the proposed Assistant Secretary for Public Health in the new department is expected to provide the desired expert supervision—although the bill calls for no technical qualifications on his part—it would be just as easy and more economical to provide such an assistant in the Treasury Department, and thus to avoid disrupting the work of the Public Health Service by tearing it out of the department in which it has developed and in which all its traditions and associations lie.

The dislocation of the Public Health Service proposed by the bill seems to ignore altogether the relations of international quarantine, a function of that Service, to the Customs Service and the Coast Guard. With nothing in the proposed Department of Education and Relief is the Public Health Service so closely tied up as it is, through its international quarantine service, with the Customs Service and the Coast Guard of the Treasury Department. In the enforcement of international quarantine, it must function through or in connection with one or the other services, or it must be provided with a navy of its own and its own corps of guards and inspectors for our international boundaries on the North and South. If it be contended that the Public Health Service in the Department of Education and Relief can coordinate its quarantine activities with the Customs Service and the Coast Guard activities of the Treasury Department as efficiently as it does when all three services are under the same supervision and control, then the converse must be true; and the Public Health Service, if left in the Treasury Department, can equally well coordinate its work with the work of any bureau in the proposed Department of Education and Relief that may need its cooperation. The proposed shifting of the Public Health Service to the new department would appear to be quite unnecessary.

The enactment of this bill in its present form seems likely to accomplish nothing of benefit to the public health movement. It will place international and interstate quarantine and the control of the manufacture of therapeutic biologic products in a Department of Education and Relief, and leave the hygiene of maternity and infancy in the Department of Labor. The collection and study of health statistics it will assign to the Department of Commerce, and public health activities among the Indians will remain in the Department of the Interior. It will provide no expert supervision for the Public Health Service that cannot be provided equally well in the Treasury Department, in which that service has functioned for so many years, and moreover may disrupt its work. In view of the importance of the public interests of the country involved, and of the irrational basis on which the functions concerned are now organized and on which they will remain organized under the proposed law, amendments to the pending bill seem to be demanded. Unless amendments which will procure coordination and greater efficiency in public health administration be made, the bill should not be enacted.

WATER IN THE BLOOD

Water is of widespread importance in physiology. That the water of the blood is available for various purposes is shown by numerous types of experiment. For instance, the saline cathartics probably are efficacious through their attraction of water to the intestine by osmosis. This idea has recently received added support from experiments which showed that, in cases of dehydration, the saline cathartics fail to effect purgation.[1]

Barbour [2] has emphasized the importance of water for heat regulation. His own research on the mechanism of the action of antipyretic drugs fortifies the theory that in fever there is a lowered water content in the circulating blood with consequent concentration, attended with decreased evaporation and heat loss. Such anhydremias of fever have been attributed to the excess avidity for water of the hydrophilic colloids in the blood. On the other hand, it might be expected on purely physical grounds that a decreased concentration of any soluble constituent of the plasma would also result in a loss of water in proportion to its relative osmotic pressure. A recent contribution of Drabkin and Edwards [3] adds experimental confirmation to this hypothesis. Using modern therapeutic equipment, these investigators have shown that insulin hypoglycemia is accompanied by a definite anhydremia as measured by the percentage of hemoglobin and the red cell count, and that subsequent intravenous injection of glucose solution immediately tends to restore the normal water content of the blood. These results indicate not only that the removal of some of the blood sugar through the action of insulin so reduces the osmotic pressure of plasma that water passes out of the circulation, but also that the process is reversible, resulting in the ultimate establishment of physiologic balance. Moreover, Drabkin and Edwards mention the increase in viscosity,

1. Underhill, F. P., and Kapsinow, Robert: The Effects of Saline Cathartics in Conditions of Dehydration, J. A. M. A. 82:19 (Jan. 5) 1924.
2. Barbour, H. G.: Physiol. Rev. 1:295 (April) 1921.
3. Drabkin, D. L., and Edwards, J.: Am. J. Physiol. 70:273, 1924.

decreased clotting time and the dark color of the venous blood," observed when the greatest hypoglycemia occurred.

These observations agree in general with those reported in experimental dehydration, in clinical anhydremia, and in war gas poisoning. A common feature in all these conditions, in addition to the loss of circulatory water, is anoxemia due apparently to a decreased oxygen combining power of the hemoglobin, which, in turn, may be conditioned by the physical character of the blood. It seems not unlikely that the dark arterial blood, the decreased clotting time and the rapidly dropping temperature observed in fatal insulin shock may be due partly to the gradually increasing anhydremia produced by the lowering of the blood sugar. The foregoing instances emphasize the possible far reaching effects in the body of the alteration in the amount of water in the circulation. The equilibrium must be maintained for physiologic well being, and here again, though this time from a physical point of view, one must recognize the importance of small changes in securing large results in the living organism.

OXYGEN USE AT LOW BAROMETRIC PRESSURES

The heralding of innovations in the transport of man in the air, and particularly of the attainment of a new altitude record, serves to promote reflection regarding the demands that such achievements may make on the physiologic mechanism. In comparison with the five miles or more to which aeroplanes have ascended, the height of the tallest mountains of this continent seems small; yet an altitude of from 25,000 to 28,000 feet brings us to an atmosphere in which the oxygen content is lowered to 8 or 7 per cent. The essential cause of the physiologic disturbances that may develop into sufficient prominence to be termed altitude sickness is a lowered supply of oxygen to the body. It has long been known that when such a deficit is threatened, adaptive changes of varied sorts occur. Obviously, the oxygen pressure in the blood should remain sufficiently high to supply the needs of the active cells in the brief interval during which the blood is passing through the capillaries. Complete deprivation of oxygen results in asphyxiation and death; yet the question has often been asked whether under less drastic conditions the quantity of oxygen taken up by the cells is conditioned primarily by the needs of the cells or by the supply of oxygen.

Ordinarily, the answer has been given that the cells take what they need and leave the rest. Most physiologists have maintained for many years that the oxidative processes of the body are independent, within wide limits, of the oxygen supply. From a chemical standpoint, the velocity of the reaction between oxygen and oxidizable substances, and consequently the consumption of oxygen per unit of time, should depend on the number of molecules able to take part in it; and if the molecules of one of the substances (the oxygen) become fewer, the velocity of the reaction must decline, unless indeed their number is so large that it can be considered as infinite compared with the number of molecules with which it has to react. Krogh [1] has ventured the belief that the oxygen pressure is practically the limiting factor for the oxidations, but that it is so regulated as to be just sufficient. A diminution of the oxygen supply to the tissues, which will take place when the oxygen pressure in the inspired air falls below something like 85 mm., causes a decrease in the rate of oxidation, while an increase in the oxygen pressure appears to produce a slight increase.

In a study of the gaseous metabolism made by Schneider, Truesdell and Clarke [2] at the school of Aviation Medicine at Mitchel Field, Long Island, on men and women during short exposures to low barometric pressures, the conclusions already reached by Krogh receive support. The consumption of oxygen during anoxemia, caused by lowering the barometric pressure in a low pressure chamber to between 410 and 310 mm. for from thirty to sixty minutes, was reduced in a large majority of the persons tested. This represents the atmospheric conditions prevailing at altitudes exceeding 15,000 feet. In prolonged exposures of from three and one-half to eight hours to a barometric pressure of approximately 400 mm., the oxidations of the body, after a period of reduced rate, tended to return to normal and in some cases to rise above normal. The excessive rate of metabolism appeared to be associated with the onset of symptoms of "mountain sickness." However, if satisfactory acclimatization changes occur, the rate remains normal. Thus, the conquest of high peaks, and the advent of airships and aeroplanes, are serving to make the study of the respiratory metabolism more critical and exact.

Current Comment

THE CONSTANCY OF THE BASAL METABOLISM

The increasing attention devoted to the measurement of the basal metabolism of man as an index of his physiologic normality inevitably awakens reflections as to the real value of such estimates and particularly the constancy of the data. There are other physiologic measurements that show a surprising uniformity not only in the same person tested from time to time but also in different individuals. This is true, for instance, of body temperature, pulse rate and, in lesser degree, of blood pressure, among the physical factors in the organism. The glucose and chlorid content as well as the hydrogen-ion range of the blood represents chemical "constants," while the limited variations in the number of blood cells per unit of circulating

1. Krogh, A.: The Respiratory Exchange of Animals and Man, London, 1916, p. 73.
2. Schneider, E. C., Truesdell, D., and Clarke, R. W.: Oxygen Consumption in Men During Short Exposures to Low Barometric Pressures, Am. J. Physiol. 70: 283 (Oct.) 1924.

medium is similarly striking. There are data now available to show that a man between 30 and 40 years of age may show a basal metabolism during the course of a decade or more with a variation of less than ± 8 per cent.[1] The veteran experimenter Zuntz recorded his basal metabolism over a period of three decades with little variation. There tends to be a slow decline with advancing years. Careful observations on animals indicate that confinement in cages tends to reduce the basal metabolism to a lower level, whereas outdoor life in the sunshine and fresh air serves to raise it. This seems to find its counterpart in human metabolic experience when there is lack of exercise and confinement indoors.[1]

NARCOTICS SWELL FEDERAL REVENUES

The federal government profited during the fiscal year ended June 30, 1924, by more than three hundred thousand dollars in its administration of the supposedly non-revenue producing Harrison Narcotic Act, according to the Annual Report of the Commissioner of Internal Revenue, just submitted to Congress. Income from "narcotic taxes of all kinds" was $1,057,066.33, and the cost of administration was but $709,790.66. A considerable part of the government's profit was derived from the continuance of the war tax on physicians under the Harrison Narcotic Act, which is one of the few war taxes—possibly the only war tax—not yet restored to a peace basis. The logic by which this tax is imposed on physicians, with no similar occupational tax on other professional groups, is a mystery. Prevailing opinion is to the effect, however, that no change in the present tax law will be undertaken during the present short session of Congress.

THE DISAPPEARANCE OF RABIES FROM ENGLAND

Forty-five years ago, in December, 1880, Pasteur inaugurated his study of rabies. July 6, 1885, he first used on man the protective treatment which he had proved on animals. "There ought to be a calendar of the healing art," says Stephen Paget, "to remind us of all such days." As a result of the antirabic treatment for which Pasteur's pioneer studies paved the way, the mortality from rabies has been brought almost to the vanishing point. But this is not all that has been accomplished. Pasteur demonstrated rabies to be an infectious disease. By establishing a quarantine covering the incubation period and muzzling all dogs, it should be possible to stamp out the disease. This has happened in Great Britain, which, as an island, is particularly favorably located for such prophylaxis. Consequently, we read[2] with delight the circular of the British ministry of health that in view of the disappearance of rabies in animals in England and Wales (no case having occurred since December, 1921), it has been decided that special arrangements for antirabic treatment are no longer necessary. What an achievement of modern science! What a triumph of preventive hygiene! And let us not forget the beneficent contribution that animal experimentation rendered to make this blessing a possibility.

1. Lusk, Graham; and Du Bois, E. F.: On the Constancy of the Basal Metabolism, J. Physiol. 59: 213 (Oct.) 1924.
2. Disappearance of Rabies, London Letter, J. A. M. A. 83: 1781 (Nov. 29) 1924.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

CALIFORNIA

Relapsing Fever.—A case of relapsing fever has been discovered at Westwood, it is reported, and the diagnosis has been confirmed. A number of cases of this disease occurred in 1874 among the Chinese of Oroville.

Personal.—Dr. Charles W. Harrison, formerly professor of anatomy, College of Medical Evangelists, Loma Linda, and assistant superintendent, White Memorial Hospital, Los Angeles, has accepted the superintendency of the Sydney Sanitarium, Sydney, Australia, and is now *en route* to England to qualify for British territory.——Dr. Leslie H. Butka, St. Helena, sailed, November 20, for Shanghai, China, where he will engage in medical missionary work.——Dr. Ralph H. Kuhns, department of pediatrics, University of California School of Medicine, gave an address on "The Symptoms, Diagnosis and Treatment of Malnutrition in Children" before the parent-teacher associations of the north section of San Francisco, November 19.

CONNECTICUT

Diploma Mill "Graduates" Lose Appeal.—In a decision criticizing five "eclectic doctors" and the Connecticut Eclectic Examining Board for "fraud and collusion," the superior court judge dismissed their appeals, December 4, from the action of the state board of health in revoking their licenses. Judge Avery said, it is reported, that these diploma mill graduates "were guilty of the grossest fraud in presenting themselves as qualified to take examination at all, it being evident that they had no qualifications whatever and that the so-called medical schools from which they claimed degrees were not in any sense of the word medical colleges but simply mills for the issuance of medical degrees to unqualified persons, a fact known to the applicants and to some, if not all, of the Connecticut Eclectic Medical Examining Board."

GEORGIA

Physician Imprisoned.—Dr. H. W. Davis, Augusta, was found guilty, December 4, in the U. S. district court, of violating the Harrison Narcotic Law and was sentenced to thirty months in the federal penitentiary at Atlanta, it is reported.

Personal.—Dr. Beron D. Blackwelder, Gainesville, has been elected health officer of Waycross.——Dr. Mercer Blanchard has been appointed president of the Council of Health and Public Health Education of Columbus to succeed Dr. Jesse M. Anderson. The council is composed of representatives from the medical, dental, civic and educational organizations of the county and is associated with the city and county health officers, the juvenile advisory board and the military authorities at Fort Benning.

ILLINOIS

Spurious Doctor Jailed.—Francisco Padillo, Joliet, recently represented himself as a physician, promising to cure the daughter of Doneta Lopes of advanced tuberculosis. Padillo, having managed to collect a $500 fee before the patient died, was arraigned before Judge McCulloch, December 5, and, unable to furnish bonds, was sent to jail, it is reported.

University Lectures.—William W. Cort, Ph.D., of the School of Hygiene and Public Health of Johns Hopkins University, Baltimore, lectured at the University of Illinois, November 10, on "Problems of the Orient for Parasitologists"; November 11, on "Hookworm Investigations in China Under the Auspices of the International Health Board";

November 12, "Parasites and Parasitic Diseases in China." The lectures embodied the results of Dr. Cort's work as special investigator for the International Health Board and lecturer at the Peking Union Medical College.

Chicago

Child Health Library.—The Elizabeth McCormick Memorial Fund, 848 North Dearborn Street, Chicago, maintains a library of several thousand volumes on nutrition, health education, school hygiene, mental hygiene and child psychology, as well as the standard periodicals. This library is at the disposal of health and social service workers and others interested in child welfare. There is a package service maintained, and the only expense is the cost of transportation.

Typhoid from Oysters.—Seven deaths from typhoid fever in the last few days in Chicago were reported, December 13, at which time a total of thirty-four cases of typhoid fever had been reported, most of which were attributed, according to the health commissioner, to infected oysters. On the previous day it was reported that 300 residents of New York, most of them persons of wealth, were victims of typhoid fever. Reports from various other cities and suburbs of Chicago indicate an outbreak of typhoid fever. Health Commissioner Monaghan, New York, stated, December 11, that while oysters were under suspicion, it was not yet certain as to what caused the outbreak of the disease at this time of the year.

INDIANA

Book Service for Gary Hospitals.—At a recent meeting of the board of the Gary Public Library, it was decided to furnish book and magazine service to patients in the local hospitals. The library will supply an attendant to deliver books to the hospitals, and the latter will provide noiseless book trucks to distribute them in the wards.

Five Physicians Cited.—The state board of medical registration and examination issued citations, December 11, to five physicians to appear before the board, January 13, to show cause why their licenses should not be revoked. The physicians are, it is reported, Drs. George L. Dickerson, Reece C. Townsend, Winfield S. Rowley and Edward A. Porter, all of Indianapolis, and Dr. Milton P. Tolliver of Westphalia.

Demand for Sterilization Law.—Under a sterilization law passed in 1907, a total of 118 prisoners at the Jeffersonville Reformatory were sterilized by vasectomy. Governor Marshall opposed this practice, and the law became inoperative. A test case to determine the constitutionality of the law was arranged, and in 1921 the supreme court declared the law unconstitutional. According to the Indiana State Board of Health, there is a state-wide demand now for the reenactment of a sterilization law, and a bill is being prepared to present to the next legislature.

Society News.—At the thirty-eighth annual meeting of the St. Joseph County Medical Society, South Bend, Dr. William Engelbach, St. Louis, gave an illustrated lecture on "Treatment of Ductless Gland Disorders"; Dr. Alfred Henry, Indianapolis, spoke on "Cardinal Points in the Diagnosis of Pulmonary Tuberculosis," and Dr. Ernest E. Irons, Chicago, on "Symptoms and Treatment of Chronic Infection." Dr. Jones L. Wilson, president of the society, presided.——Dr. John F. Barnhill was recently elected president of the Indianapolis Ophthalmological and Otolaryngological Society. Dr. William F. Molt, vice president, and Dr. Robert E. Repass, secretary.

IOWA

County Society and Cancer Control.—The Scott County Medical Society, Davenport, conducted a cancer control program, December 8-12, in which more than 3,000 American Society for the Control of Cancer pamphlets were distributed in all institutions having reading rooms. The newspapers published articles and editorials concerning cancer control, public meetings were held, and the film, "The Reward of Courage," was exhibited twice daily.

New State Board of Health.—Under the new law, which becomes effective, Jan. 1, 1925, the Iowa State Board of Health will be composed of the governor, the members of the executive council, the state commissioner of health and five health officers. The executive council comprises the secretary of state, the treasurer, the auditor and the secretary of agriculture. The health officers appointed by the governor to the state board of health are Dr. Harley L. Sayler, Des Moines; Dr. Edward M. Williams, Oskaloosa; Dr. Charles W. Stewart, Washington; Dr. Herbert R. Sugg, Clinton, and W. D. Hayes, Sioux City, each the health commissioner of his respective city. The state commissioner of health is Dr. Rodney P. Fagen. The board will meet for the first time the second Tuesday in January.

KANSAS

Eleanor Taylor Hospital Opened.—This hospital for communicable diseases, formerly known as Bell Memorial Hospital, Kansas City, was reopened, December 15. Its wards are open to residents of Kansas City, who pay according to their ability, professional care being furnished free by the University of Kansas Medical School. Any physician in good standing in his local county medical society may treat patients in the private rooms. Private patients outside of Kansas City will be received as long as room permits.

KENTUCKY

Personal.—Dr. John W. Duke, Hindman, has taken up the duties of county health officer of Johnson County to succeed Dr. Derby H. Swengel.——Dr. G. W. Duvall, Owensboro, has tendered his resignation as head of the health department of Daviess County, effective the first of the year.

Trachoma Caravan Burned.—The old, mule-drawn prairie schooners, which for years traveled through Kentucky mountains, one a shelter for the surgeon, another for the nurses and the third filled with medical supplies for victims of trachoma, were destroyed by fire, November 27. They will be replaced by motor trucks, and where necessary by a train of pack mules. This trachoma caravan would stay out for months in the mountains and on the last trip treated 1,246 cases of trachoma.

LOUISIANA

Supreme Court Enjoins Chiropractor.—Otis E. Cronk, chiropractor, Alexandria, was recently permanently enjoined by the supreme court from practicing chiropractic, the court sustaining the lower court, it is reported. The suit against Cronk was instituted by the state board of medical examiners.

Church for Lepers Dedicated.—The new church at U. S. Marine Hospital, No. 66, Carville, the national leprosarium, was dedicated, December 3. Gifts totaling $33,000 towards the cost of erection of this building have been received, the total cost of which is said to have been more than $50,000. The building is Gothic and will seat more than 200 persons.

Plague Infected Rats in New Orleans.—Dr. Oscar Dowling, president, state board of health, announced two conferences, December 7, between state, city and federal health officers to consider the situation disclosed by finding four plague-infected rats along the wharves at a different location from that where a plague-infected rat was found, November 22. Routine trapping of rats in New Orleans has yielded an average of about 2,000 per month since July 1, 1923, but no infected rats were found until the above date. Measures have been instituted at New Orleans to protect local and foreign interests.

MARYLAND

Survey of Subnormal Children.—Intelligence tests and physical examinations of subnormal children in the county schools of Montgomery County will be made this month under the direction of the state board of mental hygiene. This, the state's first step in preventive work in the schools, will be conducted by Dr. Fannie Haines, under the direction of commissioner of mental hygiene, Dr. Arthur P. Herring. It is being made at the request of the county superintendent of schools and Dr. William T. Pratt, county health officer.

Personal.—William Einthoven, professor of physiology, University of Leyden, gave a lecture under the auspices of the Herter Lecture Fund on "The Relation of Mechanical and Electrical Phenomena of Muscular Contraction with Especial Reference to Cardiac Muscle," December 2, at Johns Hopkins Hospital, Baltimore.——Dr. John Sundwall, professor of hygiene and public health, University of Michigan Medical School, Ann Arbor, lectured on "Health Activities in the University," at the School of Hygiene and Public Health, Johns Hopkins University, December 1, this being one of the De Lamar lectures in hygiene.——Dr. William Rush Dunton, Jr., for years on the staff of the Sheppard and Enoch Pratt Hospital, Towson, has taken over Harlem Lodge, Catonsville, a private sanatorium for nervous and mental dis-

orders, formerly conducted by the late Dr. Richard F. Hundry. ——Dr. Birkhead Macgowan, superintendent, Sydenham Hospital (the Baltimore city hospital for contagious diseases), is on a trip of inspection of similar hospitals in New York, Boston and Providence, R. I.

MASSACHUSETTS

Conference on Mental Hygiene.—Among others, Dr. Charles W. Eliot, president-emeritus, Harvard University, Cambridge, addressed a public conference on mental hygiene and education, State House, Boston, December 5-6, on "Mental Hygiene of the College Student." William H. Burnham, Ph.D., Clark University, Worcester, spoke on "The Contributions of Mental Hygiene to Education." A demonstration clinic was conducted by psychiatrists of the Boston Psychopathic Hospital.

MICHIGAN

Alpha Omega Alpha Lectures.—The University of Michigan chapter of this fraternity has arranged a course of lectures by Drs. George F. and Gladys R. H. Dick, December 4; Dr. Frederick G. Banting, January 13; Dr. Richard C. Cabot, April 23, and Dr. Wade H. Brown, Rockefeller Institute, New York, sometime in March.

Sidelights on Detroit's Epidemic.—In an address before the annual conference of health commissioners of Ohio, the week of November 10, Henry F. Vaughn, health commissioner of Detroit, said that there was a total of 124 cases of hemorrhagic smallpox during the recent epidemic in that city, and 123 of these were fatal. The surviving case was found early, and convalescent serum resorted to. In those exposed to hemorrhagic smallpox, of 268 who had not been vaccinated for more than five years, eight developed discrete, four confluent, and four hemorrhagic smallpox; of the 146 vaccinated less than five years, no cases, and of the 248 unvaccinated, fifteen developed discrete, ten confluent and 12 hemorrhagic smallpox. Dr. Vaughn said: "Our Christian scientists, no doubt, furnished us with the largest number of cases and the largest number of deaths." Some administrative features of the epidemic were a change in the quarantine procedure so as to catch the contacts by sending a physician and a policeman to their homes late at night or early in the morning; holding unprotected contacts for twenty-one days and protected contacts for five days. One minister who delivered a scathing denunciation of vaccination died of smallpox. An employer who had his men vaccinated but refused to be vaccinated himself contracted smallpox. A telephone operator, who refused to be vaccinated, died of hemorrhagic smallpox.

MINNESOTA

Smallpox at Minneapolis.—It was reported, December 15, that sixteen deaths from smallpox and eleven new cases had occurred in Minneapolis in the last two days. There seems now to be a "wholesale" response to the advice of health officials about vaccination. The director, student health service, University of Minnesota, announced, it is reported, that nearly all of the university students have been vaccinated.

MISSOURI

Society Celebrates.—The Southwest Missouri Medical Society celebrated its fiftieth anniversary at a banquet in Springfield, November 20, during the two day fall session of the society, under the presidency of Dr. Otto C. Horst, Springfield.

Chiropractor Convicted.—R. B. Downing, St. Joseph chiropractor, was found guilty by jury, December 5, of practicing medicine without a license, and sentenced to pay a fine of $50. Ten other chiropractors are awaiting trial on similar charges. In charging the jury, the judge said, it is reported, that if the defendant was found to have treated the sick by manipulating, adjusting or massaging the muscles and nerves of the body, he was practicing medicine and surgery and should be found guilty, and the attorney for the defense said that "the chiropractor does not make a diagnosis, he gives no medicine, he doesn't even feel the pulse."

Endowment Raised Through Insurance Policies.—St. Mary's Hospital, St. Louis, is raising an endowment fund of $1,500,000 by means of five year endowment life insurance policies. Four hundred insurance men pledged themselves in October to sell policies to this amount, the beneficiaries of the policies to be the Sisters of St. Mary, St. Mary's Hospital. The endowment fund consists of five year endowment policies, written on the lives of the policy holders, in return for which the sisters guarantee to each one of the insured free hospital treatment for life. St. Mary's Hospital is the university hospital of St. Louis University, and is a center of research and medical education as well as a large general hospital.

NEW JERSEY

Smallpox at Camden.—Thirty-seven cases of smallpox in Camden, and four deaths, have been reported since late in July, when the first virulent case was discovered. These were the first fatal cases of smallpox in the state in eight years. There are now about a dozen smallpox patients in Camden.

County Society Considers Verdict.—A court decision awarding "heavy damages" against Drs. William E. Ogden, county physician, and his consultant, Frank Freeland, for signing a certificate of insanity was the sole topic discussed at a recent meeting of the Bergen County Medical Society. The court, says the *Journal of the Medical Society of New Jersey*, seems not to have been satisfied with the testimony of the medical staff of the state hospital to which the patient had been sent, to the effect that the patient had been insane for a considerable length of time prior to the examination, nor with the opinions of the defendants. The court held that the defendants must prove not only that the patient was insane to a degree which would make her a possible menace to herself or the community, but must prove beyond peradventure of doubt that she was a probable menace.

NEW YORK

University News.—Dr. Errett C. Albritton, for two years a National Research Council fellow in physiology at Ohio State University, Columbus, has been appointed associate in physiology at the University of Buffalo.—Dr. P. Thomas McIlroy, formerly of Brandon, Manit., has been appointed instructor in pathology at the University of Buffalo Department of Medicine.

Typhoid Carriers.—There were ninety-six typhoid carriers listed in the state, exclusive of New York City and state hospitals, October 1. Twelve of these have been discovered since January 1, eight by local health officers, two by attending physicians and two by representatives of the state health department. In addition to the twelve discovered this year, two carriers who have been out of the state have returned, two others have moved from the state, four have died, one previously listed as a carrier has been transferred to the suspected list, and one was successfully operated on for removal of the gallbladder.

Hiccup Epidemic.—At a meeting of the Public Health Council of the State, November 20, the subject of epidemic hiccup was considered, several instances having come to the attention of the health department. Dr. Simon Flexner said: "Epidemics of hiccup have at times coincided with or followed in the wake of outbreaks of epidemic encephalitis. The precise relationship of the two conditions is not known. They appear to be in some way connected with each other. Although the hiccup may persist for several days, the condition usually subsides. Fatalities, unless caused by some serious complication, are very rare." Physicians are requested to send to the state health department detailed reports of any fatal case.

Hospital News.—The Warren County Board of Supervisors has appropriated $200,000 for a new county tuberculosis hospital, which will be built at once. The county medical society and the county committee on tuberculosis and public health cooperated to obtain this appropriation, which is not supplemented by the state.——Bids for the construction of the Soldiers' and Sailors' Memorial Hospital group at Kings Park, nineteen buildings of which will cost $4,500,000, were closed, November 19.——The Children's Home of Northern New York, Plattsburg, plans a $50,000 addition.——The New York Orthopedic Dispensary and Hospital is building a private pavilion, adjoining the present hospital building on Fifty-Eighth Street, to be completed about May 1 and to have a capacity for thirty-two private patients. A new building with a capacity for thirty-five has just been opened at the hospital's country branch, White Plains, in connection with its convalescent service for patients with joint tuberculosis. When this construction program is finished, the hospital will have a total capacity of about 300 persons.

Rural Medical Service.—The state department of health has, since 1918, assisted in securing physicians for rural communities in New York. On request of a community for a physician, the district state health officer makes an investigation, reporting whether the need is as stated and whether a physician could make a living in that community. When

the report is favorable, the name of the community is sent to physicians inquiring for locations. This department has been instrumental in securing physicians for seventy-two communities. There are twenty-nine places listed as in need of physicians now and the prospects in some are poor. A town in Essex County voted to pay a physician $2,200 a year; a town in Washington County expects to give a bonus to a physician now located there, and a town in Dutchess County states it will "do something" to secure a physician. Thus far in 1924 physicians have been secured in seven communities. However, this work has now been turned over to the executive officer of the state medical society, Dr. Joseph S. Lawrence, 51 Chapel Street, Albany, N. Y.

New York City

Pasteur Relics.—Columbia University has received from the dean of the school of chemistry of the French University two flasks and a U-tube used by Pasteur when he was dean of the Faculty of Sciences, University of Lille (1854-1857).

Gift to Visiting Nurses.—Mr. and Mrs. Felix M. Warburg have donated $500,000 to the Visiting Nurse Service, which is the outgrowth of the Henry Street Nursing Service, founded by Lillian D. Wald and Mary Brewster in 1893; its present staff cared for 50,000 patients last year. The income from this gift will provide for the employment of seventeen additional nurses.

Operating Rooms Donated.—Three of the operating rooms in the proposed Presbyterian Hospital at the new medical center, One Hundred and Sixty-Fifth Street and Broadway, will be donated, each costing $37,500. One will be given by Edwin J. Walter and Frederick Beineck to commemorate the golden wedding anniversary of their parents, April 22, 1925; another by Mrs. William V. A. Thorne and another by Mr. and Mrs. Louis J. Horowitz. Space will be provided for eight operating rooms.

Another Pay Clinic.—Another New York hospital has announced the opening of a pay clinic to replace its free dispensary, and the former charge of 50 cents has been raised to $5. There is no appreciable difference, says the *New York Medical Week*, in the nature of the service offered under the new system. The treatments are given by the same physicians in exactly the same way, and on the surface the reasons given (improved service and better care) do not seem entirely sincere. The hospital is not affiliated with a teaching institution nor is the additional money being used to pay the dispensary staff.

Society News.—Dr. Cassius H. Watson, medical director, American Telephone and Telegraph Company, New York, delivered a public lecture at the New York Academy of Medicine, December 10, on "Some Aspects of Medicine in Industry."——The anniversary discourse of the New York Academy of Medicine was given by John H. Finley, Ph.D., editor of the New York *Times*, December 18, his subject being "Three Fields of Human Activity."——At the recent annual meeting of the New York Medico-Surgical Society, the following officers were elected: Dr. Walter T. Dannreuther, president; Dr. William P. Healy, vice president; Dr. Alfred C. Prentice, secretary (reelected).

Factory for Convalescent Tuberculosis Patients.—A new factory building has just been opened at West Farms Road and Jennings Street, the Bronx, by the Committee for the Care of the Jewish Tuberculous. It is open on all sides, the walls being practically of glass. Only part of the roof is enclosed, the remainder being available for recreation and rest. The health of the employee will determine the length of his working day, and a nurse will prevent the workers from working unduly. Those unable to maintain their families on their earnings will receive a supplementary income. This factory is similar to another where results show a reduction of about 15 per cent. in the number of patients who relapse after receiving sanatorium treatment. Among those who spoke at the dedication were Dr. Frank J. Monaghan and Rabbi Stephen S. Wise.

NORTH CAROLINA

Society News.—The Gaston County Medical Society gave a reception, December 4, in honor of the state board of medical examiners, in special session at Gastonia, December 4.——At the twenty-ninth session of the Seaboard Medical Association, composed of physicians living east of Richmond in Virginia and east of Raleigh in North Carolina, December 3-5, Dr. Robert L. Payne, Norfolk, Va., was elected president; Drs. Major I. Fleming, Rocky Mount, N. C., and Russell M. Cox, Portsmouth, Va., vice presidents, and Dr. Clarence P. Jones, Newport News, Va., secretary. The next meeting will be in Norfolk.

Huge Fund for Hospitals and Schools.—It was announced, December 8, that James B. Duke has established a trust fund of at least $46,000,000 for educational and charitable purposes in North and South Carolina. The fifteen trustees are empowered to expend $6,000,000 in North Carolina to establish Duke University, with the provision that if Trinity College, Durham, will change its name to Duke University, the sum may be spent in expanding that college. The trust provides that 20 per cent. of the income shall be added to the principal each year until it aggregates about $86,000,000. Of the remaining income, Duke University is to receive 32 per cent. and the same amount is to go to assist in building and equipping hospitals in North and South Carolina. The remainder of the income is for various charitable purposes, for white and colored orphans, for pensions for superannuated preachers, for certain colleges and for building Methodist Episcopal churches in rural districts of the Carolinas.

OHIO

Personal.—Dr. James J. Chandler, Soldiers' Home, Kan., has been appointed resident physician to the Joint County Tuberculosis Hospital, Chillicothe.——Dr. Frank R. Makemson has been appointed coroner of Logan County, to succeed Dr. Wilson C. Pay, resigned.——Dr. Emery R. Hayhurst, professor of hygiene and head of the department of public health, Ohio State University, Columbus, delivered the De Lamar lecture at Johns Hopkins University School of Hygiene and Public Health, November 3, on "The Occupational Aspects of Common Disabilities."——Dr. Cornelio D. Julian, Dayton, has been appointed assistant surgeon of the Ohio Soldiers and Sailors Home, Sandusky.——Dr. Benjamin R. McClellan has been elected dean of the volunteer medical and surgical staff of the Ohio Soldiers and Sailors' Orphans Home, and Dr. Asa C. Messenger reelected secretary of the staff.——Dr. James I. Nisbet, Eaton, has resigned as physician of the Preble County Home and will be succeeded in that position by Dr. Horatio Z. Silver, Eaton.——Dr. Robert H. Bishop, Jr., has been reelected a trustee of Western Reserve University, Cleveland.——Dr. Ford C. Ganyard, Wooster, has been appointed a member of the Wayne County Board of Health, to succeed Dr. Willis E. Purdy of Dalton, who resigned because of ill health.——Dr. Fred F. DeVore, Whitehouse, has been elected county health commissioner of Lucas County to succeed Dr. Koenig, who resigned to become health officer of Hancock County, W. Va.——Dr. Frank Light, Ottawa, has been appointed county health commissioner.

PENNSYLVANIA

Annual Banquet.—The Cambria County Medical Society held its annual banquet at the Sunnehanna Country Club, Johnstown, November 13. One hundred and twenty-five physicians and their wives attended. There was an exhibition of moving pictures taken during the summer outings of various members of the society, and of other pictures of interest to physicians.

Conference of Representatives of Mental Hospitals.—Ten of the thirteen licensed county mental hospitals sent representatives to a conference at Harrisburg, November 12, to consider the question of complete state care of mental patients. The county representatives finally passed a resolution recommending that the state department of welfare prepare a bill to present to the next legislature. This bill would establish a commission to look into the question of complete state care, its merits as compared with the present dual system, and to ascertain the value of the different properties and recommend a practical method of establishing complete state care, should it finally be decided to make the change.

Philadelphia

College of Physicians Protests Change in Law.—At a meeting, December 3, the College of Physicians adopted the following resolution:

> WHEREAS, Universal vaccination is the only certain known means of protecting the public against smallpox; therefore, be it
>
> *Resolved*, That in the interest of the public health and welfare, the College of Physicians of Philadelphia strongly protests against any change in the present Compulsory Vaccination Law of Pennsylvania.

Personal.—Dr. Albert E. Roussel has been made a chevalier of the Legion of Honor by the French government.——Dr. Harry E. Ungereider, chief physician at the Eastern State Penitentiary Hospital, has resigned, effective January 1.——Dr. John W. McNee, University College Hospital Medical School, London, England, addressed the Pathological Society at the College of Physicians, December 11.——Dr. Percy S.

Pelouze, retiring president of the Aesculapian Club, was guest of honor at a dinner given by the members of the club, December 4. Dr. Frederick S. Baldi, who succeeds Dr. Pelouze, presided.

RHODE ISLAND

Hospital News.—The Miriam Hospital, Providence, closed a drive for funds, December 7, in which nearly $80,000 was subscribed.

Society News.—At the regular quarterly meeting of the Rhode Island Medical Society, Providence, December 4, Dr. William Wayne Babcock, Philadelphia, gave the address on "The Evolution of Surgery of the Stomach." The president, Dr. William F. Barry, Woonsocket, appointed delegates to attend the annual meetings of the state medical societies of all the New England states.

TENNESSEE

Physician Sentenced.—Dr. Mason P. Guill, Chattanooga, was sentenced, December 2, it is reported, to serve eighteen months in the federal penitentiary at Atlanta for violation of the Harrison Narcotic Law.

VIRGINIA

Acting Dean Appointed.—Dr. James C. Flippin, professor of clinical medicine, University of Virginia Department of Medicine, Charlottesville, has been appointed acting dean of the medical school for the 1924-1925 session, following the death of Dean Hough.

PHILIPPINE ISLANDS

Cholera at Batangas.—The last case of cholera in the epidemic at the city of Batangas occurred, July 23, according to Dr. Gabriel Intengan y Vito, of the Philippine Health Service, who said that anticholera vaccinations were being administered on an average of 6,000 per week, there being three parties working simultaneously in Lipa, Batangas, and in Taal.

Personal.—The *Journal of the Philippine Island Medical Association* notes the departure for the United States of Col. Edward L. Munson, M. C., U. S. Army, for the last three years medical adviser to the governor general, and of Lieut. Col. Fielding H. Garrison, M. C., U. S. Army, in whose honor a smoker was given at the University of the Philippines, Manila, September 3.——Dr. Benito Valdes y Salvador's appointment as a member of the council of hygiene was confirmed by the senate, August 20.

CANADA

Christian Scientists and Manslaughter.—Warrants charging manslaughter were recently issued for the arrest of two Christian scientist practitioners of Winnipeg and for the father of Doreen Watson, aged 12, who died of diphtheria, it is reported. The warrants followed the finding of a coroner's jury, according to reports, that the parent had been guilty of gross negligence and that the practitioners had committed a breach of the medical act of Manitoba.

Hospital Rates Exorbitant.—Dr. Frederick W. Routley, secretary, Ontario Hospital Association, addressed the first annual meeting of that association in Toronto recently on "Uniformity of Tariff." Dr. Routley maintained that charges paid by private patients in hospitals in Canada are out of all proportion to rates paid in the public wards, and that private patients are paying for the upkeep of the public wards. Dr. Routley advocated that municipalities pay the actual cost of maintenance of patients in public wards. Although this was the first annual meeting of the association, more than 80 per cent. of the hospitals in Ontario were represented.

Compulsory Vaccination.—Nine hundred and twenty-seven municipalities in the Province of Quebec have complied with the order of the director of the Provincial Bureau of Health to make vaccination compulsory in their territory. Of the 423 remaining municipalities, two have refused to pass the required law, 224 are still corresponding with the board concerning the matter, according to the *Public Health Journal* (November), and 197 were expected to answer any day. The director of the provincial bureau of health based his order on that part of the Quebec Public Health Act which authorizes him "in the interest of public health to compel municipal councils to exercise and enforce such of their powers as, in his opinion, the urgency of the case demands." In this instance, the urgency was due to the smallpox epidemic at Windsor and other Ontario towns early this year.

GENERAL

Fraternity Convention.—The seventeenth annual convention of the Phi Lambda Kappa Fraternity will be held at the Plaza Hotel, New York City, December 26-28. Among others, Drs. Samuel A. Loewenburg, Moses Behrend and Abraham I. Rubenstone, all of Philadelphia, will speak.

Study of Foster Children.—The Commonwealth Fund has granted $15,000 for a study of foster children, to be divided equally for that purpose by Lewis M. Terman, Ph.D., Stanford University, and Frank N. Freeman, Ph.D., University of Chicago, the former to compare foster children and their foster parents, the latter to make a comparison between foster children and their brothers and sisters, to determine whether the advantages which foster children receive enable them to make a higher score on mental tests.

Dr. Benedict on Lecture Tour.—Under the auspices of the Mayo Foundation, Francis G. Benedict, Ph.D., director of the nutrition laboratory, Carnegie Institution, Washington, D. C., recently lectured at universities and medical schools in the Middle West on "The Measurement and Significance of Basal Metabolism." Dr. Benedict lectured from November 17 to 22 at the University of Iowa, University of Nebraska, University of Minnesota, University of Wisconsin, Mayo Clinic and at Washington University Medical School.

Fund for Mental Hygiene.—It was announced, December 1, by Dr. William S. Welch, director of the School of Hygiene and Public Health, Johns Hopkins University, Baltimore, and honorary president of the National Committee for Mental Hygiene, that the sum of about $30,000 had been given to that committee by the Rockefeller Foundation to establish scholarships in mental hygiene work. The scholarships will entitle the holders to special study for about two years, and will be open to medical graduates from all parts of the country.

Reports on "Ethyl Gasoline" Denied.—Recent reports in certain newspapers that a committee of the American Chemical Society considered ethyl gasoline of such great value to the public that its use should be permitted, are not authentic. According to W. P. Deppé of the Deppé Motors Corporation, New York, the secretary of the American Chemical Society, Charles L. Parsons, replied to an inquiry that no committee of the American Chemical Society has taken any action on the use of so-called ethyl gasoline and has not reported or even considered the matter.

Millions for Higher Education.—George Eastman, Rochester, N. Y., after recently announcing a gift of $2,500,000 to the University of Rochester, announced, December 8, new gifts of $12,500,000 to certain educational institutions. The Massachusetts Institute of Technology is to receive $4,500,000, which is added to a previous gift of $11,000,000. The University of Rochester, Rochester, N. Y., is to receive $6,000,000, of which $1,500,000 goes to the medical school, Hampton Institute, $1,000,000, and Tuskegee Institute, $1,000,000. Of Mr. Eastman's total gifts of more than $58,000,000, the University of Rochester has received more than $23,000,000.

Passes to Panama.—The United Fruit Company has renewed its offer of last year of a small number of passes on its boats between New York and Colon, Panama, C. Z., for properly accredited scientific investigators who wish to work at the Barro Colorado Island Laboratory. To workers properly accredited to the National Research Council by the executive committee of the Institute for Research in Tropical America, the company offers five round-trip passes in 1925. These passes do not include meals. Applications for passes should be addressed to Thomas Barbour, Ph.D., in care of the National Research Council, Washington, D. C., or at the Museum of Comparative Zoology, Cambridge, Mass.

Society News.—At the annual meeting of the Southern Surgical Association, Charleston, December 9-11, Dr. Irvin Abell, Louisville, Ky., was elected president; Drs. Stephen H. Watts, University, Va., and Archibald Johnston Buist, Charleston, S. C., vice presidents. The present secretary, Dr. Hubert A. Royster, Raleigh, N. C., and treasurer, Dr. Urban Maes, New Orleans, remain in office until 1927. The next meeting will be in Louisville, Ky., December, 1925.——At the annual meeting of the Radiological Society of North America, Kansas City, Mo., December 8-12, Dr. Arthur W. Erskine, Cedar Rapids, Iowa, was installed as president, and the following officers elected: president-elect, Dr. Manly J. Sandborn, Appleton, Wis.; vice presidents, Dr. William C. Wescott, Atlantic City, N. J., Dr. W. Herbert McGuffin, West Calgary, Alta., Dr. William B. Bowman, Los Angeles; secretary-treasurer, Dr. Robert J. May, Cleveland.

Report of Freedmen's Hospital.—This hospital was operated to full capacity during the last fiscal year, according to the annual report to the Secretary of the Interior. Of the patients admitted, 1,055, including ninety-five births, were pay patients; 1,494, including 172 births, were indigent residents of the states, and 1,572, including 131 births, were indigent residents of the District of Columbia. There were 2,321 surgical operations performed, 1,629 emergency cases treated, 2,115 anesthetics administered, 1,147 roentgenograms made, and 200 roentgen-ray treatments given. The pressing need of the hospital is a larger home for nurses. In some instances, there are three nurses occupying one room hardly large enough for one; others are crowded on the third floor of the main building. Additional space is also urgent to house female interns, who lodge outside the hospital, at their expense, while the male interns have rooms in the hospital building. It is estimated that $50,000 will be required to remedy this situation. The training school graduated thirteen nurses, May 8, 1924, making a total number of 392. The isolation building, with a capacity for fifty patients, was completed.

Report of Columbia Institution for the Deaf.—There was under instruction at the close of the last fiscal year in Gallaudet College a total of 125 pupils, representing the District of Columbia, Canada and thirty-five states of this country. This was a decrease of nine compared with the preceding year. In the primary and grammar department, known as the Kendall School, there was under instruction a total of forty-eight, and these were admitted as beneficiaries of the District of Columbia. The increase in appropriations of $3,000, granted by Congress for 1925 for current expenses, made possible a small increase in the salaries of some poorly paid employees; but the rates of pay for teachers, according to the annual report submitted to the Secretary of the Interior, are not what they should be in comparison with those paid in good schools for the deaf. The institution needs an administration building. The Conference of Superintendents and Principals of American Schools for the Deaf, held at St. Augustine, Fla., last January, urged this institution to enlarge its normal training department. The National Research Council agreed to send during the coming year Robert H. Gault, Ph.D., of Northwestern University, Chicago, to conduct special investigations into the possibility of understanding spoken sounds through the sense of touch.

Bequests and Donations.—The following bequests and donations have been announced recently:

To the Maine General Hospital, Portland, $15,000, by the will of Margaret Deering Gilman Bursley, Portland, and an additional $1,000 to a fund for aiding nurses in that hospital.

To the Holyoke State Hospital, Holyoke, Mass., a gift of $100,000, by William and Joseph Skinner, of the William Skinner and Sons Silk Company. The gift marks the one hundredth anniversary of the birth of the late William Skinner.

To Perkins Institution and Massachusetts Home for the Blind, $5,000; the Industrial School for Crippled and Deformed Children, Boston, $5,000; the Faulkner Hospital Corporation, $5,000, by the will of Miss Ellen Bacon, Jamaica Plain, Mass.

The will of Miss Katherine E. Hunt, Danvers, provides that the residue of her estate, estimated at about $75,000, be left in trust, which after the death of her sister and brother-in-law is to be used for the construction or purchase of a hospital for Danvers.

Washington University, St. Louis, the residue of the estate of the late Ellis Wainwright, St. Louis, estimated to amount to about $600,000.

To victims of leprosy, $25,000, by the will of the late Eugenia Earle, Omaha.

The Hebrew Home and Hospital, Brooklyn, $1,000, through the annual masquerade ball.

St. Andrews Convalescent Hospital, $5,000, by bequest of the late Eufrasia Leland.

The Home for Incurables, New York, the entire estate of the late Charles Ross Keen, except $1,000 left to the Salvation Army.

Fifth Avenue Hospital, New York, $30,000, and St. Luke's Hospital, $15,000, by the will of the late Mrs. Georgie A. McDonald.

The Hampton and Tuskegee Endowment Fund a gift of $250,000, by an anonymous New York banker.

The Butterworth Hospital, Grand Rapids, a gift of $15,000 from Mrs. T. Stewart White, Grand Rapids, for the furnishing of a solarium.

The Women's Medical College of Philadelphia, $3,000, by the will of the late Dr. Anna Odell, Detroit.

Mount Sinai Hospital, New York, $7,500, by the will of Ella Hellman.

Broad Street Hospital, New York, a donation of 10,000 units of insulin.

Mortality Rate for 1923.—The Department of Commerce announces that the mortality rate for the registration area in the United States was 12.3 per thousand population in 1923, against 11.8 in 1922. Colorado, Idaho, Montana, Oregon, South Carolina, Utah and Washington show lower mortality rates for 1923 than for 1922. Of six states which show by color refined rates for 1923, Maryland has the highest (12.6 per thousand) for the white and also for the colored (22.8); and Mississippi the lowest (9.7 for the white and 15 for the colored). Of the twenty-four other states which show refined rates, but not by color, the highest rate (13.3) appears for Delaware, the lowest (8.7) for Montana. Of the eleven cities which in 1920 had 100,000 population or more, and which show by color refined rates for 1923, New Orleans has the highest mortality rate (14.5) for the white, and Atlanta for the colored (31.6), while Norfolk has the lowest rates for both white and colored (8.3 and 18.7, respectively). Of the forty-four other cities which in 1920 had 100,000 people or more, and which show rates but not by color, the highest rate (15.7) appears for San Antonio and the lowest (9.5) for Portland, Ore. The total number of deaths in the registration area was 1,193,017. The increase in the rates from influenza from 31.4 per hundred thousand of population in 1922 to 44.7 in 1923, and the increase from pneumonia from 102.1 in 1922 to 109 in 1923, account for nearly half the increase in the death rate from all causes. Some other causes for which the rates increased, according to the Department of Commerce, are heart disease, measles, whooping cough, cerebral hemorrhage, cancer, automobile accidents, nephritis, railroad accidents and accidental falls. A decreased death rate appears in the report for tuberculosis, diphtheria, malaria, typhoid and paratyphoid fever.

FOREIGN

Unrecognized Epidemic in Japan.—An advance report of the health section of the League of Nations notes an epidemic of more than 6,500 cases of an unidentified disease which occurred in Japan, starting last July, reaching its height in August and subsiding in September. It spread over the whole country, affecting many in the cities, but was most severe in the rural section where it started. The case fatality rate was about 55 per cent. The disease involved the central nervous system, resembling epidemic encephalitis, without the usual eye symptoms; the onset was sudden; there was a high temperature and loss of consciousness in one or two days. The summer was unusually dry, and, with the coming of rains the epidemic subsided. More than one case in a household was rare.

The General Practitioner.—The *Medical Journal of Australia* published its first "education number" in 1920 under a plan adopted to avoid the annual repetition of much detail that appears in the education numbers of some other journals. A five year cycle was introduced so that emphasis could be given successively to five different themes which concern undergraduates and recently qualified graduates in medicine. The October 25 issue of this journal, addressed to the general practitioner, completes the first cycle. Next year the cycle will start again, and, after four years, one education number being devoted to the medical curriculum in the Australian universities, one to the public medical services, one to the "defense" medical services, and one to research, will return again to the general practitioner's number.

Tercentenary of Thomas Sydenham.—To celebrate the three hundredth anniversary of the birth of Sydenham, a reception was held at the Royal College of Physicians of London, November 12, on which occasion Sir Humphry D. Rolleston, president of the College, gave an address on "Sydenham: Father of Clinical Medicine in Britain." Sir George Newman has written a biographical essay to celebrate this tercentenary, which in five chapters deals successively with Sydenham at Oxford and in London, with Sydenham as a physician, with his books, and with Sydenham, the man. The *British Medical Journal* says that very little has been left by Sydenham in the shape of letters and manuscripts; but that the Royal College of Physicians possesses one most important manuscript entitled "Medical Observations by Thomas Sydenham," a folio volume containing his observations on various diseases, not a complete work but merely his notes, probably written down from time to time.

Deaths in Other Countries

Dr. **Albin Hoffmann**, professor emeritus of internal medicine at Leipzig, aged 81.——Dr. **A. Alsberg**, for forty years director of the Jewish hospital at Hamburg, aged 69.——Dr. **Max Steiger**, privatdocent for radiology and obstetrics at Bern, a pioneer in roentgenology in Switzerland, and a victim of the roentgen rays, aged 44.—— Dr. **von Holwede**, long director of the public hospital at Braunschweig, aged 74.

CORRECTION

Dr. Glasgow a Graduate.—The late Dr. Benjamin Benzion Glasgow, New York, whom THE JOURNAL (September 13, p. 860) noted as a nongraduate, graduated from the New York University Medical College, 1896, under the name of Benzion Klyachko.

Government Services

Veterans' Bureau Legislation

A bill which has for its purpose the improvement of the medical service of the Veterans' Bureau has been introduced by Congressman Snyder of New York. The bill fixes the pay and allowances of physicians in the Veterans' Bureau on a basis equivalent to that of medical officers of the army. It is generally recognized that the present uncertain tenure of the medical personnel of the Veterans' Bureau and inadequate salaries make it difficult to retain high grade medical men in that service. At the last session of Congress, a bill was introduced to meet this situation, but it failed to pass.

The Surgeon General's Library

The medical library in Washington, under the direction of the Surgeon General of the army, is the largest medical library in the world. According to the Surgeon General's report, just published, this library contains 801,887 volumes and pamphlets. It has the latest editions of all standard medical books in foreign languages as well as English, and 496 medical incunabula, books printed prior to the year 1500. There is in the latter collection the first complete edition of Hippocrates, printed in Venice in 1526; the Opera Omnia of Galen, printed in 1490, and the works of De Medicina of Celsus, printed in Venice in 1497. There are many other rare manuscripts and a complete file of theses of the University of Paris, the largest collection of these works in existence, not excepting that at the University of Paris itself. There is also a current file of almost 1,900 periodicals and a collection of 6,778 portraits of famous medical personages. Physicians visiting Washington are welcome at the library, and certain literature will be forwarded for short periods to physician outside that city.

Report on Health of Indians

The annual report of the Secretary of Interior shows that the total Indian population of the United States is 346,902. This is an increase of 2,599 in Indian population over that of the preceding year. It is pointed out by the report that these figures prove that the Indians are becoming a healthier people. Health activities are now being centered against tuberculosis and trachoma, the two most prevalent Indian diseases, which are generally yielding to better hospitalization and sanitary improvement in Indian homes. An aggressive campaign against trachoma was organized last year, and is progressing in the Navajo country of the southwest, in cooperation with the United States Public Health Service, the local health bureaus and Red Cross societies. A division of field welfare was added to the service and a trained nurse of large experience placed in charge of 100 or more field nurses and field matrons whose duties will be systematized and made more effective. The surveys and visits of Red Cross nurses were very helpful and will be continued. The action of the recent session of Congress in authorizing increases of salaries to physicians in the Indian Service ranging from 50 per cent. to 100 per cent., has, without question, improved the morale of the physician employees of the government in the Indian Service.

Report of Public Health Service

A significant fact brought out in the annual report of Dr. Hugh S. Cumming, Surgeon General, U. S. Public Health Service, is the reduction in deaths from tuberculosis. In 1900 there were, in reported cases, 195.2 deaths per hundred thousand in population; in 1921 the mortality rate, in reported cases, was 94.7, a reduction of more than 100 per cent. Typhoid fever has declined from 31.3, in 1900, to 5.3, in 1921. Measles remains a grave menace to childhood, a very decided increase occurring in 1923 with 752,529 and 10,282 deaths, as compared with 260,833 cases and 3,592 deaths in 1922. In 1922, there were 99,426 reported cases of whooping cough and 4,405 deaths, a mortality rate of 4.4 for every 100 cases; 164,380 cases were reported, in 1923, and 8,899 deaths, a mortality rate of 5.5 for each 100 cases. In 1923, there were 12,339 reported cases of deaths from diphtheria, as against 14,684, in 1922. "With improved methods," says the report, "there is no reason why diphtheria may not still further be greatly reduced if people will avail themselves of means of preventing this disease." In 1923, there were 3,771 cases of smallpox reported, with 160 deaths; while in 1922, 30,247 cases were reported with 758 deaths.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Dec. 6, 1924.

Birth Control

Birth control has become a burning question in this country. Lord Dawson of Penn, physician to the London Hospital, startled the medical as well as the ecclesiastical world by championing it at the Church Congress in 1921. Now, in evidence given before the Birth Rate Commission of the National Council of Public Morals, he has gone still further. He said that sex love should be the physical expression of a lasting affection and associated with a love of and desire for children. By sex love he meant love that involved sexual union or the desire for such; by birth control, that the conception of children should be a matter of choice, not chance. Discussion of the principles and methods of birth control should be kept separate. The methods of birth control should be set forth to those people alone whom they properly concern. Regulation of the number of childbirths has been brought about by several factors: (1) increasing density of population; (2) increasing sense of the responsibility of parenthood; (3) social and domestic difficulties in the homes of educated people, and (4) the desire of women for a larger share in the world's working. Is it desirable or possible to restore the conditions of former generations—large families with their high death rates and rough-and-tumble methods? If not, the birth rate must and will be controlled by restraint or by devices against conception. Restraint, to be effectual, means virtual celibacy over long periods. Think what this means in marriage with desire present on both sides. Is sexual union as an end in itself right? Church authorities evade the real problem: they half apologized for sex love or seemed to ignore this dominating force in the world. The right view was that sex love had, apart from parenthood, a purpose of its own and was an essential part of health and happiness in marriage. Birth control was spreading now to the industrial classes. Statements that it was immoral or contrary to the teachings of Christianity would only bring disrepute to those who made them.

Dr. Marie Stopes, whose writings have made her the protagonist of birth control in this country, has lost in an appeal to the House of Lords. In a previous letter, an account was given of her libel action against Dr. Halliday Sutherland, a Roman Catholic physician, who wrote in a book against birth control a paragraph headed, "Exposing the Poor to Experiment." He said: "It is truly amazing that this monstrous campaign of birth control should be tolerated by the Home Secretary. Charles Bradlaugh was condemned to gaol for a less crime." The jury returned a rather contradictory verdict, finding that the words were defamatory, that they were true in substance and fact, and that they were not fair comment. They awarded $500 damages. The lord chief justice held that this verdict was in Dr. Sutherland's favor. The court of appeal reversed this decision. A final appeal was then made to the house of lords. In giving judgment, the lord chancellor said that their lordships were not concerned with any question as to the desirability of contraception. The defendants, in effect, said that the plaintiff was taking advantage of the ignorance of the poor to subject them to experiments. By this he meant, as he told the jury, not that at the plaintiff's clinic surgical experiments were made on poor persons, but that they were there subjected to a social experiment which was contrary to the laws of nature. The jury found that this was true. What, then, remained of the alleged libel of "unfair comment." One of

the judges, Lord Wrenbury, delivered a dissenting judgment. He referred to the importance of the question of birth control and to the commission mentioned above and the evidence of Lord Dawson of Penn. He did not consider that the subject was obscene, though the method dealing with it might be. Whether it was obscene or not was a matter of opinion. The jury had decided, by its answer to the third question, that it was not obscene. It found that the defendant's comment was not fair, and awarded damages. If this finding were not to have effect, he thought that the plaintiff was entitled to a new trial.

The Roman Catholic party in this country, which is uncompromisingly opposed to birth control, has hailed the result "as a great victory gained for the cause of morality," to use the words of Cardinal Bourne. Addressing the Catholic Congress of England and Wales, he said that it was the belief of all Catholics and, he would fain believe, of all Christians that the practices denounced by Dr. Sutherland were contrary to the God-given moral law. History taught that these practices had invariably sounded the doom of a nation. The dangerous position of France in Europe arose from them. In his gallant fight, Dr. Sutherland had received support almost exclusively from the Catholic body of the country.

On the other hand, a plea has been made in *Guy's Hospital Gazette* for the instruction of medical students in the principles and technic of contraception. In an editorial on the subject, the *Lancet* states that it urged this course nearly four years ago on the same grounds—that the apathy of physicians is largely responsible for the general dissemination of knowledge of birth control from an emotional rather than a medical angle. The subject is not referred to in the medical curriculum, and the majority of young physicians are not competent to weigh the social and domestic consequences of enjoining complete abstinence in married people who for economic or medical reasons should not produce a large number of children, against the alternative of giving instruction in appropriate methods of contraception.

Lunacy Reform

In previous letters, the inquiry of the Royal Commission on Lunacy Law and Administration and Mental Disorder has been described. At the latest one, Dr. Henry Devine, medical superintendent of the Borough Mental Hospital, Portsmouth, gave important evidence. He said he thought that the Lunacy Act as an instrument of detention was almost perfect—as perfect as any human instrument could be. There were some defects in it. The act was too insistent on the view that every patient should be certified. Their patients, being mostly rate-aided patients, were received with only one medical certificate. He regarded the present method of writing out certificates as quite good, and in ten years as a superintendent he had found only one person who was a malingerer, and he had discharged him as not being insane. All the cases came under his survey within seven days after admittance; and he thought that every certificate should be signed by two physicians, though in rate-aided cases the cost would be double what it is now. It would be advisable to have a department in an asylum to which middle-stage cases, which were dealt with provisionally, could be sent until their ultimate fate could be determined. Such an advantage could not be afforded by a Poor Law infirmary. At Portsmouth they had a system of classification of cases on arrival, and after examination they were sent to the proper wards. There was a certain gap in the present system between what they wanted and what they had. They were the victims of an antiquated structure. He did not approve of large asylums, and he should be glad if they had sufficient money to build villa hospitals. He had never had a patient that had been detained improperly. Some patients were generally found to be useful in connection with the asylums, but he did not agree that they were detained in order that they could be employed in unpaid work. It seemed to him a proper thing that they should be encouraged to do work, because it was not only for their own benefit but also for the benefit of the community. The bias of the physician was always to get a patient out of a hospital, and the more he got out the more was he pleased. As to a patient's means of communication with the outside world, he declared that every possible access was given. Nobody could have a better opportunity of airing their views to the superintendent, the committee or their friends. Small asylums formed one of the most important points in the whole question of hospital provision. Instead of multiplying enormous buildings, asylums should be made organic parts of the towns to which they belonged. As regarded cases without certification, he said that such cases might militate against others being dealt with at the earliest possible moment. Many uncertifiable cases could, of course, be treated in nursing homes and other institutions outside mental hospitals. Public asylums should be used only for patients certified as being of unsound mind; and he advocated complete dissociation from the poor law. It would be a good thing to have the services of an expert before certificates were signed. A superintendent with 2,000 cases in the hospital could not possibly maintain sustained observations on doubtful cases; and that was one reason why he advocated small villa hospitals. Dealing with the stigma of certification, the witness said that people who had been certified were subjected to a very trying and insidious censorship if they returned to normal life in the outside world. He had known cases in which people had watched every movement, action and sign of the children of a certified person, looking for symptoms of abnormality.

"World Right-Side-Upness"

In his presidential address at the Royal Society, Sir Charles Sherrington dealt with the researches in nerve physiology, in which for fifteen years Professor Magnus and his collaborators have been engaged in the Utrecht laboratory, and have now brought to approximate completion. Its field, he said, had lain in nervous mechanisms which, though the highest part of the brain could have touch with them, could yet of themselves work wholly reflexly and separately from mind. A number of simpler acts, studied for the most part in lowlier animal forms, had, of course, long been known to stand in that relation to the higher brain. But the Utrecht researches proved a like relation in the superior mammals for acts surprisingly complex—the assumption and maintenance of the erect posture of walking, running, and so forth, in all their ordinary completeness. Plant growth orientated itself in regard to the line of gravity (geotropism); and so in the rabbit, cat and monkey, standing, walking, running with their element in common, the erect attitude, were shown by Magnus and de Kleyn to be refined geotropic reflexes. Any position other than the erect one excited in the reflex animal restoration of its erectness. The head, for instance, is righted by an act having its unconscious source in the pull and pressure of two microscopic stones in the special pair of tiny gravity organs embedded in the skull. With righting of the head goes rotation of the eyeballs in the opposite sense, keeping the vertical meridian of each retina in correspondence with the actual vertical. Appropriate reflexes brought the whole animal from any other position into the symmetrical right-side-up one. The well known maneuver which enabled the cat, when inverted and falling from a short height, to right itself in the air during its fall, alighting squarely on its feet, was shown by Magnus and his colleagues to be executed perfectly by reflex action, after removal of the entire higher

brain. Detailed analysis proves this whole reaction to be a chain of reflexes, again essentially geotropic. It is less true to say that the higher animal under direction of its mind keeps itself right side up than to say that the animal body by automatic mechanism is kept right side up. By the Utrecht researches, that relation is shown to be maintained by processes as nonmental as is digestive secretion of the bile. Hence this right-side-upness being settled without mind, and indeed prior to mind, and naive mind being, whatever else it is, utilitarian, the situation has not invited consideration from naive mind. Professor Magnus' researches enable us, therefore, to trace how, in the make-up of mind, right-side-upness of the world comes as an innate unargued datum, an immediate intuition, and therefore largely eludes mental analysis, there being no direct sense experience of its origin or elemental processes, although there is confusion in mental space when its elements conflict. William James, with characteristic picturesqueness, wrote that our "prehistoric ancestors discovered the common-sense concepts," among them what he termed "one-space." With that we may set "world right-side-upness," but as for dating its "discovery" to our prehistoric ancestors, it, as an immediate intuition, must date back not to the merely prehistoric, but to the entirely prehuman.

Physiologic Difficulties in the Ascent of Mount Everest

At the Royal Geological Society, Major R. W. G. Hingston of the Indian Medical Service, medical officer to the Mount Everest expedition of 1924, delivered an interesting address on this subject. He said that the most obvious difficulty was the alteration in breathing caused by increasing altitudes. Heights below 10,000 feet hardly produced any noticeable change of condition in the climbers; this became definitely apparent, however, at 14,000 feet, and at 19,000 feet, the slightest exertion, such as tying a bootlace, made breathing more labored and severe. At 28,000 feet, it was possible to progress only a few yards at a time, with intervals of several minutes for rest. Norton, at about 28,000 feet, after an hour's climb, was only 80 feet higher up, and this was the highest point reached without the use of oxygen. Dealing with the effects of altitude on circulation, blueness of the face and lips, and coldness of the extremities were the indications of impaired circulation noticed at 19,000 feet, these symptoms being accompanied by only a slightly accelerated pulse when at rest; any exertion, however, resulted in a markedly increased rate of the pulse. Further, the well known change in the number of red corpuscles in the blood took place, increasing from 4,480,000 at 700 feet to nearly twice that number at 18,000 feet. Muscular weakness was not so noticeable as that described by airmen, probably because of the slowness of the ascent; but this condition came on as soon as inhalation became inadequate. Other senses affected by the height, such as diminution of taste and smell, were noted by only two of the party. Pain, except for slight headaches, which disappeared after short periods of rest, was practically nonexistent, but there was a pronounced loss of appetite, generally at the highest altitude. Considerable thirst was also induced by the dryness at the highest points. Oxygen discounted the expectations which, on theoretical grounds, had been entertained. Acclimatization was, after physical fitness, the chief factor in success. Those who had already taken part in the former expedition suffered less on the second occasion. The after-effects of the expedition were, apart from frost bite, chiefly dilatation of the heart and loss of weight, but the return to lower altitudes quickly restored the party to normal health. Major Hingston concluded that though the physiologic difficulties were severe, they could be overcome, and he believed that climbers could reach the summit, even without oxygen.

BELGIUM

(From Our Regular Correspondent)

Nov. 28, 1924.

Trypanosomiasis

The Société belge de médecine tropicale has just published the comprehensive government report prepared by Dr. Schwetz, head of the first antitrypanosomiasis mission to the Belgian Congo, which operated in Kwango-Kasai from 1920 to 1923. The mission carried out a first examination and treatment; then a second examination and treatment, of all the natives in the eight territories. In Kikwit alone, a third examination and treatment were given.

The mission gave treatment in 84,740 cases of trypanosomiasis and administered 847,400 injections of sodium arsanilate (atoxyl) and other arsenicals. There were untold difficulties to overcome, among which was the lack of census statistics. An enormous amount of work was accomplished in a region in which there are few administrative officials and in which there is a high incidence of the disease. In the territory of Kikwit, 12.8 per cent. of the population was affected; in the territory of Bulungu, 12.2 per cent.; in Kamtscha Qubne, 9.8; in Madi, 5.8 per cent., and in Kandale, 5.5. In some villages in the western part of Kwengo, the incidence reached 40, 50 and even 60 per cent. of the population. In the territory of Kikwit, 52 per cent. of the patients treated were in good health a year later. This territory was reexamined and all patients were treated for a third time, in 1923. In the 462 villages of this territory, the percentage of the population affected dropped from 15.5 in 1920-1921, before treatment was instituted, to 10.7 in 1921-1922, after the first series of treatments, and to 6.3 in 1923, a year after the second series of treatments. A number of statistical tables and maps are included in this report of the first concentrated effort put forth by the colony to stamp out trypanosomiasis, which is decimating the population and threatening to destroy the man power, which is needed more and more in its industries.

Social Medicine Among Railway Employees

At the last congress of professional medicine, held at Ostend by the Belgian medical federation, the question of the organization of the medical service for the benefit of railway employees was discussed at length. Two tendencies became manifest in the assembly. Some wished to increase the schedules of the accepted physicians; others desired to suppress the service altogether and organize for the employees a vast mutual benefit association, with the medical treatment based on the free choice of physician by the patient. Many members of the society, however, were opposed to the application of the principle of free choice of physician to the 130,000 railway employees. It was feared by some that this would result in the relaxation of discipline and in an increase of fraud.

After a prolonged discussion, the assembly passed a resolution demanding that every employee in the service of a public or private organization be accorded the right of free choice of physician. The assembly decided to use its endeavors to bring about this reform, but that, as a transitory measure, it would support the claims of the panel of physicians; that is, the periodic revision of the list of physicians entitled to give treatment to railway employees.

Obstetric Shock

An open discussion at a meeting of the Société belge de gynécologie et d'obstétrique, following a communication by Dr. Brouha, brought out several interesting facts concerning obstetric shock, which is quite comparable to shock in the severely wounded and to operative shock. Distinct from any

infection or hemorrhage, a genuine condition of shock may be produced, the pathogenesis of which remains obscure. Numerous observations of such a shock were communicated by various physicians during the course of the discussion that followed. Various theories in an attempted explanation of the pathogenesis of these accidents were advanced (reflex intoxication, bulbar ischemia, disequilibrium of the vago-sympathetic system) but none seemed to explain all the symptoms.

Society for the Study of Tuberculosis

A new society, called the Société belge d'études scientifiques sur la tuberculose, has been founded under the patronage of the Association nationale belge contre la tuberculose and under the chairmanship of Dr. Derscheid. The new society will hold quarterly meetings to study the material furnished by the various sanatoriums of Belgium.

Recent Researches on the Heart Beat

Dr. Demoor has presented to the Academy of Medicine an important communication on the process of cardiac contraction. It is well known that the heart beat originates in the sino-auricular node (right auricle). But a series of experiments has shown the author that a heart extract from another species may change the rhythm of the contractions in a heart that is perfused and beating regularly.

Conjugal Exophthalmic Goiter

At the twenty-third Flemish congress of medicine, Dr. Koopman presented a communication on two peculiar cases of exophthalmic goiter in husband and wife, as if contagion might have played a part. The Wassermann test was positive in both patients. It is alleged that syphilitic infection may give rise to exophthalmic goiter, and the author cited in this connection five analogous cases found in the literature.

Fat in Relation to Cancer

Before the Société belge de biologie, Dr. Lecloux communicated recently the results of his researches on the influence of fat on tar cancer in mice. Taking account of the results secured by Nakawara and Bierich with respect to the rôle of fats in the resistance of the organism to cancer grafts, Lecloux has studied the action of various fatty acids and of their salts on the evolution of tar cancer. He observed that applications of sodium oleate alternating with applications of tar retarded by from thirty to forty hours the onset of the papillomatous process. However, once the papilloma had appeared, the cancer seemed to progress as rapidly as ever; but the volume of the tumors was less than in the controls. Later experiments seem to show that it is the oleate radical that causes the action. Experiments with other fatty acids have been undertaken to discover whether the retarding action is exerted locally or on the organism as a whole.

The Georges Thone Prize

A publisher of Liége, M. Georges Thone, with a view to encouraging the scientists of the country, has decided to give each year a prize of 5,000 francs to the author of a work selected by a jury of award composed of university professors. The work will be published by his house, and the author will receive, in addition to the prize, the usual royalties. The subjects for discussion will be announced three years in advance. In 1926, the first award will be made, and the prize will go to the author of a work in the domain of natural and medical science. The topic is roentgenotherapy in its widest sense, including the action of irradiations with different wave lengths, either from the curative standpoint of a lesion other than cancer, or from the histologic point of view of their action on the principal tissues of the body.

PRAGUE

(From Our Regular Correspondent)

Dec. 2, 1924.

Death of Jaroslav Hlava

Czech medicine has suffered an irreparable loss through the recent death of Prof. Jaroslav Hlava. He was the leader of the Czech medical profession for the last two generations. Born in 1855, he graduated from the Prague Medical Faculty in 1879. While still a medical student, he worked in the laboratories of the pathologic anatomist E. Klebs in Prague, to whom he became assistant after his graduation. In 1882 he went to Germany and France, visiting the most important laboratories for anatomic and experimental research. He studied with Cohnheim, Weigert, Virchow, Stricker, Cornil, Vulpian and others. The Prague museum of the bacteriologic institute has a picture from those times showing a group of students in the laboratories of Professor Pluegge in Göttingen, where Hlava is to be seen with the chief and other students, many of whom occupy or have occupied important positions in pathologic research, such as Prof. W. T. Welch of Baltimore and Professor Wyssokovicz of Charkov. He returned to Prague in 1883, and became connected with the Czech Medical Faculty, which became separated at that time from the German Faculty. Since then he had taught pathologic anatomy at Prague until his death.

Hlava was one of those pathologic anatomists who did not approach its task from the merely morphologic point of view. He was educated at the time of the great discoveries of Robert Koch, and at once realized the enormous importance which those discoveries would play in the field of experimental and clinical medicine. He became an ardent supporter of the germ theory, and as a result the new discoveries soon found their application in clinical medicine at the Prague school. He always placed a special emphasis on the importance of experimental research in pathologic anatomy in spite of the fact that the German and at that time Austrian medical schools had a special chair for experimental pathology. Hlava's special interest was concentrated on the study of the etiology of infectious diseases. He was first to describe the hematologic picture in typhus fever, the histology of the Koplik spots in measles, and the exanthem in scarlet fever and smallpox. He published also a number of papers dealing with the problem of cancer, a subject that was his hobby. In 1913 he founded the Society for Cancer Research in Prague. After the war, the society was reorganized and its scope broadened. The popular educational campaign recently inaugurated in Czechoslovakia was stimulated by Hlava.

But Hlava's scientific activities were not confined to pathologic anatomy. His institute became the center of many researches in bacteriology and protozoology. His interest in infectious diseases brought him in close contact with epidemiology, the results of which he tried to coordinate with his anatomic and experimental findings. Although his beginnings were small, he succeeded in building up an institution bearing his name in Prague which is probably one of the largest of its kind on the continent. Combined with his energy as an investigator was his teaching ability. Practically all Czech physicians now practicing studied pathologic anatomy under his guidance. The professors of pathologic anatomy in Brno and Bratislava are from his school, and many of his former assistants occupy teaching chairs on the Czechoslovakian medical faculties in allied branches of medicine. As a result, Hlava's institute had become a center for Czech medicine where the theoretical and clinical branches of medicine had their meeting place. He was an enthusiastic lecturer, and his lectures were the best attended in the faculty. In spite of the fact that he was a severe examiner,

he was very close to the growing generation, always on the lookout for new talent. He was a well known personality at the international medical congresses. He had intimate relations especially with the scientists of Russia and other Slavic nations. When Czechoslovakia became a member of the International Office of Public Health in Paris, Hlava was nominated for the position of delegate from Czechoslovakia. He was well qualified for this task because, since the beginning of the independent life of the new state, he was the president of the state health council. The enumeration of his professional activities would not be complete were one to omit mention of his presidency in the Society of Czech Physicians, which he helped to organize and which has become the important center for the contact of the medical faculty with the practicing physician. For a good many years he was also the editor of the journal of the Czech physicians. In spite of his manifold activities in the professional field he found the time for other endeavors of Czech public life. Under the Austrian régime he was a member of the senate and participated intensively, especially in the preparation of the law on epidemics, in 1913. For a number of years he was also the president of the board of trustees of the national theater in Prague, where he showed his profound interest in arts. There was practically no field in Czech public life and especially in medicine in which Hlava's influence could not be felt. He could be seen in the chair of the presiding officer at every occasion, not because he wanted to but because everybody liked to see him there. No wonder that large crowds of his pupils from all the corners of Czechoslovakia accompanied him to the crematorium, and all the important scientific societies of the republic held special meetings devoted to his memory.

Problems of Popular Nutrition

One of the leading reviews recently published an article by Dr. L. P. Procházka, chief health officer of Prague and formerly minister of health. The article dealt with the problems of popular nutrition in Czechoslovakia. Dr. Procházka maintained that the Czech dietary is too rich in carbohydrates and presents little variety, being too heavy. According to Dr. Procházka, vegetables do not find their proper place in the Czech kitchen, their use being restricted to a small class of people. He concludes that the character of the diet is responsible for certain deficiencies in the national qualities of the Czechs. There are too many people overweight, and a consumption of heavy meals in the middle of the day results in a certain mental sluggishness in the afternoon, which cannot be used as productively for work as the morning. Dr. Procházka cited examples from other dietaries which should serve as models for the correction of the national habits. He emphasized especially the American preference for vegetables and the French custom to prepare light but variable meals. In the ensuing discussion, it was generally admitted that Dr. Procházka was right in his assertions about carbohydrates and vegetables, but it was shown that the main reason for the character of the diet is the general character of the country and its agricultural products, in which foodstuffs containing carbohydrates prevail. On the other hand, there was a general agreement that great changes could be achieved in the popular nutrition, and probably as a result of that in the national character, by educating the public as to the relative values of the food products and especially by educating the food producers so that proper foods could be obtained on the market in sufficient quantities.

Prosperity of the Spas

The Czechoslovakian watering places have had a prosperous season, 50,000 people having visited Carlsbad this year and about half as many, Marienbad. These numbers compare favorably with the highest reached before the World War. Not only are normal conditions prevailing now in the Czechoslovakian resorts, but also traveling through the surrounding countries has become easy, and the government is minimizing passport formalities and improving traveling facilities. There has been a remarkable change in the nationality of the guests, which reflects the change in the political situation in the world. The largest increase in the percentage of the guests is from the Scandinavian countries, which did not participate in the war and preserved their national resources. Furthermore, intimate relations between Scandinavian physicians and Czechoslovakians have been helpful in promoting the stream of guests from these countries. The absence of Russians, who formerly were very numerous, is easily explainable. The years immediately after the war witnessed also an absence of Americans, but their numbers are now increasing. Carlsbad is planning to improve the existing facilities from the sanitary as well as from the social point of view. Marienbad will extend its season, as experience has shown that all the year round there are sufficient numbers of guests who desire to restore their health in this famous watering place. Czechoslovakians have to a large extent avoided these two watering places and have gone into some of the numerous small resorts, especially in Slovakia, some of which possess mineral waters of the same potency as the famous places and are much cheaper.

Reopening of the Library

The recent reopening of the medical library was an important event in the life of the medical profession in Prague. The library is a unique collection of Czech medical literature and dates its beginnings from the early eighties of the last century. The adverse conditions of war times resulted in a temporary discontinuance of the service in the library, which was maintained from the private means of Prague physicians. Owing largely to the initiative of Dr. O. Schrutz, professor of history of medicine at the Prague medical school, the library has been reorganized with the financial assistance of the state treasurer, and reopened. This means a great deal for the further education of the medical profession and has made the library accessible to all workers interested in the history of medicine, who can find in the library many historically important works.

BERLIN

(From Our Regular Correspondent)

Nov. 22, 1924.

The Physicians and the Health Insurance Societies

At the last meeting of the federal committee for the adjustment of controversies between the physicians and the health insurance societies, the following question came up for discussion: Is it in accordance with the present regulations of the federal committee for health insurance societies independently of the admission board to engage physicians to serve in ambulatory clinics? The question was decided in the negative. The import of this decision is that the physicians engaged for the ambulatory clinics in Berlin are serving contrary to the existing legal regulations.

The Number of General Hospitals in Prussia

The number of general hospitals in Prussia, exclusive of the Saar Basin, was 2,239 in 1922 as compared with 2,218 in 1921. Of these, 1,834 were public institutions, and forty-three were university clinics. The remaining 405 were private institutions with more than ten beds. The total bed capacity of the general hospitals in 1922 was 209,215 (in 1921, 204,473), while the number of patients cared for was 1,764,354 (1,745,682, in 1921). There were 54.92 beds (in 1921, 54.04) and 463.14 (in 1921, 461.36) patients per 10,000 of population. The total

number of days of hospitalization was $1,624,621 as against $3,288,900 in 1921.

Idiosyncrasy

At the recent convention of German scientists, Professor Dörr of Basel read a comprehensive paper on the nature of idiosyncrasy from the general pathologic and, more especially, from the immunobiologic point of view. By idiosyncrasy we mean an unusual susceptibility of human beings or animals to certain substances, as, for example, medicinal and food ingredients. Up to the close of the last century, its mechanism was regarded as a problem for which no hypothesis could be ventured nor any experiment tried with any hope of success. Investigators were content to classify it according to the phenomena that it produced, or according to its inciting causes, so that the significant fact that all the various individual forms of hypersensitiveness possess still more important characteristics in common was almost lost sight of. Above all, the conception that hypersensitiveness is a manifestation occurring only in human beings had to be revised; for it was found that, through proper treatment with certain agents, pronounced hypersensitive conditions could be produced in animals. All manifestations of hypersensitiveness have these points in common: 1: The hypersensitiveness of a given individual is always directed toward a certain material or elicited by it. 2. The manifestations of an attack of hypersensitiveness have nothing to do with the effect that a substance causing hypersensitiveness (for example, a therapeutic remedy) elicits in a normal person. 3. The manifestations of hypersensitiveness, notwithstanding the divergence of the eliciting causes, are closely alike.

The symptoms of idiosyncrasy are similar to the symptoms observed after sensitization of the organism with a certain antigen followed by reinjection of the same substance, manifestations that have been studied to a wide extent on animals and are generally known by the term "anaphylaxis." The chief question which arises and which the speaker discussed at length is whether or not anaphylaxis and idiosyncrasy are the same manifestations, and especially, whether human beings through application of the proper substances—for the most part protein substances—can be sensitized the same as animals. In general, this question may be affirmed. In animals there is an acquired and an inherited hypersensitiveness, so that there are no fundamental differences between man and animals. The assumption that only a very limited number of substances are capable of producing anaphylactic symptoms in animals arose probably from the fact that anaphylactic experiments with animals have not been carried out to any great extent. The assertion that in animals no anaphylaxis to blood corpuscles occurs is due to the fact that the application of the substances to animals was not done in the proper manner. While in applying horse serum to guinea-pigs a single treatment is sufficient, after the lapse of the period of latency, to produce an anaphylactic shock following reinjection, in the case of horse serum a triple application is necessary. The same is true of pollen and of other substances. The demonstration of hypersensitiveness is not so simple in all animals as it is in the guinea-pig, in which the reaction is so strong that it sometimes results fatally. Frequently, hypersensitiveness can be demonstrated only through the examination of organ preparations.

Dörr discussed also the mechanism of the production of antibodies. He has succeeded in separating the two phases of the process, the formation in the cell and the ejection of the antibodies into the blood. A passive transmission of hypersensitiveness is possible only when the second phase also has been completed. If the second phase is omitted, as, for example, when guinea-pigs are made actively anaphylactic to blood corpuscles, the transmission of the hypersensitiveness is not possible, and it is certain that such conditions may, under certain circumstances, be found also in man.

The view entertained by the speaker that idiosyncrasy and hypersensitiveness are essentially the same thing is supported by a number of cases in which sensitization preceded observed idiosyncrasies. A definite decision of the question has not been possible as yet. That is due mainly to the fact that in the case of idiosyncrasy in a person we often are merely witnesses of the attack but have no opportunity of establishing whether the predisposition is of congenital origin or was acquired during the subject's lifetime. For example, an idiosyncrasy may be acquired by the inhalation of protein particles floating in the air, whereby sensitization is brought about. Other examples point to this possibility. It must be further assumed that different individuals react differently to sensitization; that differences exist not only in various races but also in different persons. If a person into whose organism a serum is injected does not develop serum sickness, it is doubtless due to the fact that the injected protein does not enter into a reaction with the cells. It is also possible that a changed reaction of the capillaries occurs; or an inherited abnormal permeability of the capillary walls may exist, thus inducing an increased excitability, which may be of congenital origin, and constituting a bridge, as it were, for the hereditary transmission of the idiosyncrasy. Furthermore, irregularities in salt metabolism may have some connection with the development of hypersensitiveness. The transitions from a state of idiosyncrasy to a nonidiosyncratic state are very gradual. We may regard idiosyncrasy as a defense reaction raised to its highest potency. The speaker confined himself in the main to the most important form of hypersensitiveness; namely, hypersensitiveness to protein substances. But he mentioned also hypersensitiveness to nonprotein substances, especially to medicinals, the mechanism of which is very similar to that toward proteins. A much wider conception must be given to the term "antigen." Experimental researches have shown that here, too, the transitions are gradual, and it seems almost certain that some time in the future it will be possible to produce hypersensitiveness with nonprotein substances, though this has never been realized as yet.

Marriages

BENJAMIN EDWARD HUNT, Jenkinjones, W. Va., to Miss Mary Louise Smith of Bluefield, W. Va., October 11.

WILLIAM HERMAN WHITMORE, Richmond, Va., to Miss Lucille Virginia Hodges of Danville, October 14.

BENJAMIN ELMER GLASS, Plainfield, N. J., to Miss Libby Shirley Leo of Richmond, Va., November 2.

DAVID T. GOCHENOUR, Stuarts Draft, Va., to Mrs. Sue Kendig of Washington, D. C., October 22.

PEYTON STARK LEWIS, Richmond, Va., to Miss Marie Shepherd of Charlottesville, October 14.

DONALD M. FAULKNER, Richmond, Va., to Miss Isabel Virden of Cleveland, September 24.

THOMAS GORDON REYNOLDS to Miss Cordelia Price, both of Loma Linda, Calif., November 27.

DAVID BRAKENRIDGE STUART, Dublin, Va., to Miss Mary Jane Park of Richmond, October 13.

NOTLEY CONN WITT to Miss Mary Edith Venable, both of Franklin, Ky., November 20.

ROBERT FRANKLIN STEPHENS to Mrs. Mattie Croy, both of Toledo, Ill., October 9.

GEORGE M. BLACKBURN to Mrs. Tulie Clark, both of Minier, Ill., October 31.

Deaths

David Porter Mayhew ● Colorado Springs, Colo.; University of Michigan Medical School, Ann Arbor, 1895; past president of the El Paso County Medical Society; member, Western Surgical Association; served in the M. C., U. S. Army, during the World War; formerly on the staff of the Harper Hospital, Detroit; aged 54; died, November 23, of heart disease.

William Stickney ● Rutland, Vt.; Dartmouth Medical School, Hanover, 1903; formerly instructor of orthopedic surgery at the University of Vermont College of Medicine, Burlington; served during the World War; aged 46; on the staffs of the Proctor (Vt.) Hospital and the Rutland Hospital, where he died suddenly, December 2, of angina pectoris.

William B. Lund, Burlington, Vt.; University of Michigan Medical School, Ann Arbor, 1864; formerly instructor of materia medica, University of Vermont College of Medicine, Burlington; Civil War veteran; aged 82; died, November 23, at a local hospital, following a long illness.

Thomas Dixon, Brooklyn; Rush Medical College, Chicago, 1889; formerly member of the board of health; on the staffs of the Brooklyn City, the Brooklyn Eye and Ear and the Samaritan hospitals; aged 66; died, December 1, of injuries received when struck by an automobile.

Russel Harrison Morse ● Wisner, Neb.; Creighton Medical College, Omaha, 1902; formerly city physician and member of the board of health; served in the M. C., U. S. Army, during the World War; aged 50; died suddenly, October 25, of heart disease.

Charles Montgomery Kellogg, Scarsdale, N. Y.; Medical Department of Columbia College, New York, 1874; formerly on the staff of St. Luke's Hospital, New York; aged 72; died suddenly, December 3, at New York, of heart disease.

Joseph Lorain Gilbert, Kendallville, Ind.; Bellevue Hospital Medical College, New York, 1866; member of the Indiana State Medical Association; Civil War veteran; aged 80; died, November 28, of cerebral hemorrhage.

Benjamin Joseph Bock ● New York; Columbia University College of Physicians and Surgeons, New York, 1905; aged 48; died, October 6, in Russia, of intestinal obstruction, following an operation for duodenal ulcer.

George Carruthers, Charlottetown, Prince Edward Island, Canada; McGill University Faculty of Medicine, Montreal, Que., 1883; L.R.C.P., London, England, 1883; aged 69; died recently, of cardiorenal disease.

Theodore Rothera ● San Francisco; University of Berlin, Germany, 1891; Spanish-American War veteran; on the staff of St. Mary's Hospital, where he died, November 21, of cerebral hemorrhage, aged 57.

Francis Henry Boucher ● Marshalltown, Iowa; Jefferson Medical College of Philadelphia, 1877; for fourteen years county coroner; aged 69; died, December 1, at a local hospital, of cerebral hemorrhage.

Henry De La Cossitt, Homestead, Pa.; Western Reserve University School of Medicine, Cleveland, 1893; member of the Medical Society of the State of Pennsylvania; aged 66; died suddenly, November 25.

Jacob C. Chipman ● Sterling, Colo.; Kentucky School of Medicine, Louisville, 1882; aged 64; died, November 13, at St. Joseph's Hospital, Denver, following an operation for a tumor of the stomach.

Adolph Noah Lyons, New York; Long Island College Hospital, Brooklyn, 1903; member of the Medical Society of the State of New York; aged 49; died suddenly, November 17, of angina pectoris.

Charles E. Abbott ● Buffalo; University of Buffalo Department of Medicine, 1901; on the staffs of the Emergency, Buffalo and St. Mary's hospitals; aged 50; died, November 30, of erysipelas.

William Q. Hagler, Paris, Tenn. (licensed, Tennessee, 1894); member of the Tennessee State Medical Association; aged 78; died, November 25, at the Baptist Memorial Hospital, Memphis.

Wilford O. Higgate ● Ventnor, N. J.; University of Pennsylvania School of Medicine, 1882; member of the Medical Society of the State of Pennsylvania; aged 67; died suddenly, November 28.

Eugene McDuffie Yount, Statesville, N. C.; North Carolina Medical College, Charlotte, 1902; aged 47; died, November 19, at a hospital in Charlotte, of meningitis following an operation.

John Williams, Lake Crystal, Minn.; Rush Medical College, Chicago, 1883; member of the Minnesota State Medical Association; aged 68; died suddenly, November 21, of heart disease.

James S. Smith, Warsaw, Ind.; Physio-Medical Institute, Cincinnati, 1880; Civil War veteran; formerly county coroner; aged 79; died, November 25, following a long illness.

R. A. Willis, Greenwood, Fla.; Louisville (Ky.) Medical College, 1889; member of the Florida Medical Association; aged 58; died, November 19, following a long illness.

Patrick Samuel Keogh, Salt Lake City, Utah; Bellevue Hospital Medical College, New York, 1885; aged 74; died, November 5, at the Holy Cross Hospital, of uremia.

Walter H. Mason, Hampden, Maine; Bellevue Hospital Medical College, New York, 1884; member of the Maine Medical Association; aged 64; died, November 16.

Donald C. Miller ● Marshfield, Wis.; Milwaukee Medical College, 1905; veteran of the Spanish American and World wars; aged 46; died, December 2, of heart disease.

Charles Shaw Logan ● Stroudsburg, Pa.; University of Buffalo Department of Medicine, 1885; aged 67; died, November 12, of nephritis and cerebral hemorrhage.

Eugenius A. Hildreth II, Charlottesville, Va.; Jefferson Medical College of Philadelphia, 1886; aged 60; died, November 18, of angina pectoris, at Grasse, France.

Harvey Owen Hickman, Gervais, Ore.; University of Oregon Medical School, Portland, 1905; aged 42; died, October 29, at Portland, of acute myocarditis.

Arthur Aldridge Collins, Oxford, Pa.; University of Pennsylvania School of Medicine, Philadelphia, 1912; aged 39; died, November 29, of pneumonia.

William T. Carmichael, Walesboro, Ind.; Physio-Medical College of Indiana, Indianapolis, 1885; Civil War veteran; aged 81; died, November 26.

Dennis Arthur Logan, Cleveland; Meharry Medical College, Nashville, Tenn., 1916; aged 34; was killed, November 23, presumably by bandits.

Milton Augustus Dunn, Melrose, La.; University of Louisville School of Medicine, 1874; Confederate veteran; aged 80; died, November 18.

Joseph Meinhard ● St. Louis; Marion-Sims College of Medicine, St. Louis, 1897; aged 48; died, September 10, of cerebral hemorrhage.

John Edward Bonar, Cananea, Sonora, Mexico; Cincinnati (Ohio) College of Medicine and Surgery, 1897; aged 51; died, October 31.

Glover C. Beckwith Ewell, Hartford, Conn.; Vermont Medical College, Rutland, 1891; aged 57; died recently, of cerebral hemorrhage.

John G. Walker, Forbes, Mo. (licensed, Missouri, 1890); aged 77; died, November 15, at the Missouri Methodist Hospital, St. Joseph.

Ephraim P. Brownfield, Monrovia, Calif.; College of Physicians and Surgeons, Keokuk, Iowa, 1878; aged 92; died, November 17.

John Edward Garver, Los Angeles; State University of Iowa College of Medicine, Iowa City, 1889; aged 66; died in October.

Samuel F. Hart, Joliet, Ill.; Medical College of Evansville, Ind., 1882; aged 76; died, September 3, at Chicago, of dysentery.

Alvies Agee, Ravenna, Ky.; Cincinnati (Ohio) College of Medicine and Surgery, 1891; aged 60; died, November 18, of asthma.

John E. Potter ● Milford, Ind.; Medical College of Indiana, Indianapolis, 1894; aged 56; died, November 26, of septicemia.

Louis F. Gahn, Elmore, Ohio; Medical College of Ohio, Cincinnati, 1874; aged 75; died, November 24, of senility.

J. J. Halley, Fort Collins, Colo.; Missouri Medical College, St. Louis, 1881; aged 66; died, August 13, of nephritis.

Richard Plackett, Redfield, S. D.; Rush Medical College, Chicago, 1872; aged 81; died, November 2, of senility.

Benjamin Gulley, La Plata, Mo. (licensed, Missouri, 1885); Civil War veteran; aged 84; died, November 16.

Joseph Henry Newton, Mount Vernon, Ill. (licensed, Illinois, 1877); aged 87; died, November 24.

The Propaganda for Reform

IN THIS DEPARTMENT APPEAR REPORTS OF THE JOURNAL'S BUREAU OF INVESTIGATION, OF THE COUNCIL ON PHARMACY AND CHEMISTRY AND OF THE ASSOCIATION LABORATORY, TOGETHER WITH OTHER GENERAL MATERIAL OF AN INFORMATIVE NATURE

VITAL-O-GLAND

A Crude and Indecent Piece of Quackery Declared a Fraud

On Nov. 26, 1924, Postmaster-General Harry S. New, on the recommendation of Judge Edgar M. Blessing, Solicitor of the Post Office Department, signed a fraud order debarring from the use of the United States mails a Denver concern, the Vital-O-Gland Company. The Vital-O-Gland Company, originally known as the Vital-O-Remedy Company, has been in existence a little over five years. It seems to have been a partnership arrangement between three brothers, John A. Gurley, Harry N. Gurley and Eugene P. Gurley and a brother-in-law, one Robert T. Nash. Nash acted as the general manager. Much of the stuff sent out by the concern directed the public to direct letters and make checks and money-orders payable to "B. R. Allen." B. R. Allen, it appears, is an uncle of the Gurley brothers and lives, not in Denver, where the fraud had its headquarters, but in Dallas, Texas. His name was used to give the company a confidential appeal.

The business of the Vital-O-Gland Company consisted in the sale, through the mails, of certain tablets as an alleged treatment for impotence in men and of a mechanical device called the "Vital-O-Vacuum Developer" for the alleged purpose of "invigorating" and "enlarging" shrunken and undeveloped male sexual organs. Business was obtained by circularizing lists of names bought from concerns in New York and Chicago. According to the government's report most of the "literature" was prepared by John and Eugene Gurley with the exception of a booklet which was prepared by an advertising writer in Chicago and turned over to an advertising agency in Denver by which it was put in the form in which it appeared.

Judge Edgar M. Blessing in his memorandum to the Postmaster General recommending the issuance of a fraud order, gives in considerable detail the methods used by these quacks. To quote from the memorandum:

THE VITAL-O TABLETS

"The principal piece of literature employed in the operation of this scheme is a booklet entitled 'The Secret of Staying Young.' This booklet is designed to lead the reader to believe that youth may be restored to the aged by the taking of desiccated animal glands, prepared in tablet form, into the stomach. In this booklet, and in other literature, the concern reproduces and features testimonials by elderly men, some of the testimonial givers being 82, 83 and 84 years of age. A circular headed 'Complete, Lasting Benefits Reported' contains testimonials from a number of old men and calls 'particular attention . . . to reports of *lasting benefits* made possible by treatment with a combination of gland extracts.'

"The principal preparation in the so-called 'Vital-O-Gland' lost manhood treatment is the 'Vital-O' tablet. The promoters of this scheme informed one of the inspectors who investigated this case that there are three kinds of 'Vital-O' tablets: one contains two grains of anterior lobe pituitary; the second contains two grains of anterior lobe pituitary and two grains of suprarenal cortex, and the third contains one-half grain suprarenal, one-eighth grain whole gland pituitary, two grains anterior lobe pituitary and one grain of suprarenal cortex.

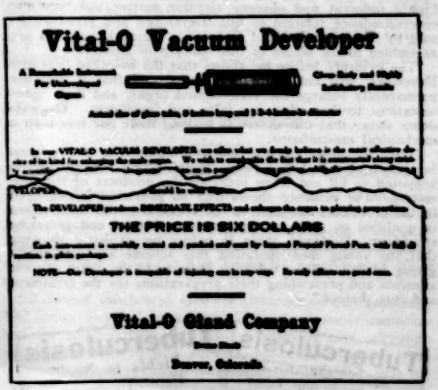
"The 'Testine Tablets,' which are sold by the promoters in their so-called 'combination' treatment, according to information furnished the inspector by the Messrs. Gurley and Nash, contain four grains of orchitic substance, one grain of lecithin and one-eighth grain of necleinic acid. 'Thidine Tablets,' also furnished as a part of the so-called 'combination' treatment, contain thyroid gland substance, according to the promoters.

"The Messrs. Nash and Gurley informed the inspector that neither of them was a physician or chemist and that they have no physician or chemist in their employ. When furnishing the formulas to the inspector they stated that they have no definite knowledge as to the ingredients of their tablets, and the inspector states that their formulas were written in a book, and in some instances they were not sure of the spelling of the names of the ingredients.

"The evidence shows that the concern does not have a 'laboratory,' and that their representation as to 'being compelled to install larger and more rapid tablet-making machines in our laboratory,' is false. Their tablets are procured from manufacturers in New Jersey and Pennsylvania.

"The evidence shows, and I so find, that the representation that: 'It has been conclusively proven, beyond peradventure of doubt, that Virile Manhood, Health and Mental Alertness can be restored to the individual by taking animal glands prepared in tablet form into the stomach,' is false and fraudulent."

The memorandum goes on to state further that the Vital-O-Gland Company was notified Oct. 15, 1924, that they must show cause by Nov. 14, 1924, why a fraud order should not be issued against them. The Gurley and Nash outfit did not appear at the time set for the hearing but sent a letter through their attorney requesting sixty days' postponement. The attorney was notified by the government that the request would not be granted unless the Vital-O-Gland Company


Vital-O Vacuum Developer

A Remarkable Instrument For Undeveloped Organs

Glass Body and Highly Satisfactory Results

Actual size of glass tube, 9 inches long and 1 3-4 inches in diameter

In our VITAL-O VACUUM DEVELOPER we offer what we firmly believe is the most effective device of its kind for enlarging the male organ. We wish to emphasize the fact that it is recommended along strictly [illegible]

VELOPER should be used [illegible]

The DEVELOPER produces IMMEDIATE EFFECTS and enlarges the organ to pleasing proportions

THE PRICE IS SIX DOLLARS

Each instrument is carefully tested and packed and sent by Insured Prepaid Parcel Post, with full directions, in plain package

NOTE—Our Developer is incapable of injuring user in any way. Is only effective on good men.

Vital-O Gland Company

Denver, Colorado

The Vital-O Gland Company, in addition to selling tablets as an alleged treatment for impotence in men, also sold a mechanical device the "Vital-O Vacuum Developer." Above is reproduced in miniature some of the advertising pulling this device.

would direct the Denver postmaster to impound their mail pending the outcome of the case. The reason for this action on the part of the federal authorities was that between the time of receiving the government's citation in October and the date on which they were to appear, the Vital-O-Gland concern mailed in one day five truck loads of advertising matter in an attempt, evidently, to make a quick clean-up before the inevitable occurred.

THE VITAL-O VACUUM DEVELOPER

The memorandum then states that, in addition to the various tablets sold by the concern Nash and the Gurley brothers were also selling the "Vital-O-Vacuum Developer." The advertising material pictured a glass tube to which a small bicycle pump is attached. Among the claims made for the device were the following, on a circular that these quacks sent out:

"A scientific instrument for developing the male organ. Produces immediate and highly satisfactory results. PERFECT ORGAN DEVELOPING APPLIANCE. Invigorates, Enlarges Shrunken and Undeveloped Organs. A WONDERFUL INVENTION.

"We are offering this invention to meet the necessity and urgent demand for a reliable Suction Apparatus for men whose special part may be so small as to be unsatisfactory for the sexual purposes of nature.

"This treatment gradually stretches and nourishes the tissues and builds new cells and thus the organ gains in power and size, in both ways.

"The usual growth after a routine treatment is from one to four inches, as detailed reports and testimonials received daily show. Indeed, there have been cases where the development has been far greater than this.

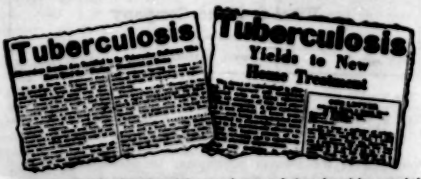
"BE A MANLY MAN. To enjoy life, to be popular and attractive with the opposite sex, and to be fit to marry, you must be a man. Weak, incompetent men hate themselves. Well developed sexual organs manifest themselves in the clear ringing voice, the glossy hair, the sparkling eye, courage and personal magnetism."

On the reverse side of the circular were numerous testimonials, some of them, as the memorandum states, "couched in very objectionable, if not actually obscene, language." When one of the Post Office inspectors who investigated the case called on the Gurleys and Nash last July and pointed out the indecent character of the circular describing the Vital-O-Vacuum Developer he was assured that distribution of this circular matter and the sale of the device would be stopped. As a matter of fact, the same circular was contained in the five truck loads of "literature" mailed by the quacks after the receipt of the citation. The memorandum continues:

"The evidence shows that twenty-two girls and five young men are employed by these promoters in sending out the highly indecent and obscene circular matter and handling correspondence relating to this 'Developer' and preparations sold by the Vital-O-Gland Company. These Developers are assembled in the offices of this concern in Denver.

"The evidence before me shows that the so-called 'Vacuum Developer' will not 'build new cells,' and that it will not permanently enlarge the male sexual organ, and that representations to that effect are false and fraudulent. The evidence shows that this device is nothing more nor less than a mechanical masturbator.

"With the other circular matter employed in this scheme is sent a so-called 'Symptom Blank' which the 'patient' is supposed to fill out when ordering the products of the promoters. The evidence shows that no physician is employed by the promoters and that no one connected with the concern is qualified to pass on the symptom blanks and prescribe treatment. However, there is before me evidence showing that the young men operating this scheme are continually giving patients advice, advising them as to the cause of their ailments and prescribing their preparations for the treatment and cure thereof."



Here are reproductions in miniature of some of the advertising carried by supposedly reputable newspapers of the "Heilol" ("Hazlan") fraud. It was through these advertisements that the General Remedies Company got in touch with its victims.

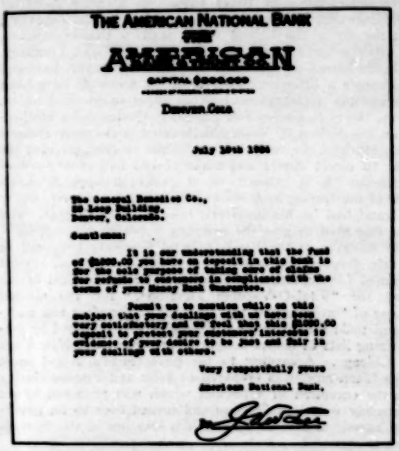
Like most mail-order quacks, the Gurley and Nash outfit had a so-called "Positive Guarantee," in which they told the public that they would refund the money if the purchaser had not experienced such improvement as he expected. The "guarantee" stated further that the purchaser was to be both judge and jury. In fact the guarantee was worthless and numerous complaints were in evidence from persons who sought to obtain refunds. Those who had taken two of the so-called "treatments" and applied for a refund were advised that they must take "six full treatments" and those who, after taking "six full treatments" applied for a refund were informed that they probably did not comply with directions. In short, the "guarantee," as Judge Blessing puts it, was "designed and intended to mislead and defraud persons solicited to remit money to this concern."

The evidence showed that the gross income of the Vital-O-Gland outfit for 1923 was $176,406.82.

HEILOL (HAELAN)

A Fraudulent Consumption Cure Debarred from the Mails

Three brothers, John A., Harry N. and Eugene P. Gurley and a brother-in-law, Robert T. Nash, have been selling a fraudulent and worthless nostrum for the alleged cure of consumption under the trade name "General Remedies Company," Denver, Colo. On Nov. 26, 1924, Postmaster General Harry S. New, on the recommendation of the Solicitor of the Post Office Department, Judge Edgar M. Blessing, signed a fraud order forbidding the postmaster at Denver to pay any postal money-orders drawn to the General Remedies Company or H. N. Gurley and to return all mail adressed to the


THE AMERICAN NATIONAL BANK
OF
AMERICAN
CAPITAL $000,000
DENVER, COLO.
July 10th 1924
The General Remedies Co.,
20 Loop Building,
Denver, Colorado.
Gentlemen:
It is our understanding that the fund of $1000.00 you have on deposit in this bank is for the sole purpose of taking care of claims for refunds to customers in compliance with the terms of your Money Back Guarantee.
Permit us to mention while on this subject that your dealings with us have been very satisfactory and we feel that this $1000.00 deposit to protect your customers' interests in outlines of your desire to be just and fair in your dealings with others.
Very respectfully yours
American National Bank,
By

As has been repeatedly shown in these columns, quacks seem to have no difficulty in getting supposedly respectable banking institutions to vouch for them. The American National Bank of Denver performed this function in the case of the exploiters of the consumption cure fraud, Heilol. According to this bank, the Heilol concern's dealings with the bank had been "very satisfactory." The government reported that the gross receipts of the General Remedies Company for the first five months of 1924 were over $22,000.

General Remedies Company and H. N. Gurley to the postmasters at the offices at which they were originally mailed with the word "Fraudulent" plainly stamped on the envelope. Nash and the Gurley brothers comprise the same outfit as were exploiting the fraudulent and indecent piece of quackery known as the "Vital-O-Gland Company" which was debarred from the use of the mails at the same time that the General Remedies Company was declared a fraud.

The alleged cure for consumption, "Heilol," was first put on the market by the General Remedies Company under the name "Hazlan" and was described as a "guaranteed treatment for tuberculosis." The business was started in September, 1923, and the concern has been advertising in about fifty newspapers covering considerable territory. Practically all of the advertisements feature "Dr. E. M. Davis, a prominent Denver physician." Davis is not a "prominent Denver physician"; he is an osteopath who, according to the evidence, got a commission on every bottle of the nostrum that was sold.

The advertising declared that Heilol had been "developed by scientific research in the laboratories at the Universities of Vienna and Zara" and had been but recently brought to America "and submitted to rigid tests among many tubercular patients in Denver." These claims also were a tissue of lies. The stuff was originated by an alien from Austria named Marko Gacina, who in 1906 peddled his medicine at Seattle. He later went to California, then to Oregon and in 1922 went to Denver where he met osteopath Davis. Up to this time Gacina had merely sold his stuff as a "stomach remedy."

Davis, apparently, invested it with its alleged virtues as a consumption cure. The federal authorities also discovered that Davis at one time was actually associated as a partner with Gacina and one Sam Charello, an Italian in the exploitation of the so-called M. G. Remedy Company.

In this connection, the following quotation from the memorandum of Judge Blessing, Solicitor of the Post Office Department to the Postmaster General, is of interest:

"The 'prominent Denver physician,' a Dr. Ezra M. Davis, who is referred to frequently in the literature as highly endorsing the Hanlan or Heilol treatment for tuberculosis, is financially interested in the manufacture and sale of the medicine and receives a royalty of 15 cents on each bottle sold. The evidence shows that the true amount of the commission paid by Gacina to Davis is not disclosed to the Messrs. Gurley and Nash, Gacina having informed the post office inspector while in the presence of the Gurleys that he pays Davis 5 per cent. But, a moment later, when alone with the inspector, stated that the amount is 15 per cent., but that he did not want the Messrs. Gurley and Nash to know that he pays Davis over 5 per cent."

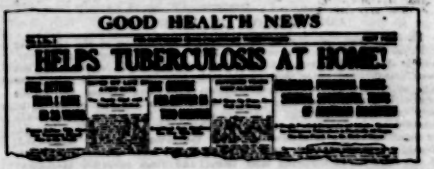
From which it seems, that while it is generally understood that there is honor among thieves, there is, evidently, none among quacks.

"Heilol" was essentially a water-alcohol solution of vegetable extractives with the following composition:

Sarsaparilla root	10 drams per gallon
Burdock root	40 drams per gallon
Stillingia root	10 drams per gallon
Poke root	10 drams per gallon
Prickly ash bark	10 drams per gallon
Senna leaves	20 drams per gallon
Mountain sage	20 drams per gallon
Slippery elm bark	20 drams per gallon
St. John's Bread	30 drams per gallon
Cascara bark	30 drams per gallon
Peaches	10 drams per gallon
Prunus	10 drams per gallon
Alcohol	5 per cent.

This formula and the claims made for it were submitted by the Post Office Department to Dr. L. F. Kebler who is in charge of Special Collaborative Investigations of the Department of Agriculture. Dr. Kebler, who is a physician and chemist and was formerly connected with a sanatorium for tuberculosis, naturally reported to the postal authorities that there was nothing in this mixture to warrant the claim that the stuff had any curative value in tuberculosis.

In the Heilol advertising matter a testimonial is published from "J. A. P., M.D." According to the federal report, J. A. P. is a Dr. J. A. Piquard. Piquard, it seems had no financial interest in the business but Gacina stated that he



Part of the advertising matter of the Heilol concern was a large sheet prepared in the form of a newspaper. This featured the picture of "Dr. E. M. Davis, prominent physician" of the sheet. Davis was not a "prominent physician"; he was an osteopath who, according to the government report, received a commission on every bottle of Heilol that was sold.

gave the medicine free to Piquard, who tried it on his patients. Careful search for the name of J. A. Piquard had been made through the records of the American Medical Association and no trace could be found of a man of this name as one legally entitled to practice medicine or a graduate of any medical school. To quote further from the memorandum:

"In his interview with the post office inspector Gacina also stated that he manufactured 2,000 bottles in June, and would manufacture 2,200 bottles in July; that after all expenses are paid, including Dr. Davis' 15 per cent. royalty, he, Gacina, receives 75 per cent. of the profit, and Charello, 25 per cent. The medicine is sold to the General Remedies Company in unlabeled pint bottles for $1.00 per bottle. These bottles are then labeled by the General Remedies Company and sold to patients at $6.00 per bottle. From the evidence it is shown that 60 bottles of the medicine are shipped per day and that the gross receipts for the first five months of 1924 were $22,294.67.

"The evidence shows that Gacina offered to pay the Food and Drug Inspector of the Department of Agriculture, who made an inspection of his place of business for the information of this Department, 20 cents for each bottle of medicine he, the inspector, would induce the Government to buy, saying that while he was under agreement to sell only through the General Remedies Company, they need not know anything about the proposed arrangement."

The "refund guarantee" was applied to this fraud as to the other fraud of the Gurley and Nash concern. Of this phase the Solicitor's memorandum states:

"When a patient requests the return of his money in accordance with the so-called 'guarantee' featured in the literature, he is asked to continue the treatment and accept five or six bottles (according to the amount of his claim) in lieu of the claim against the concern on this 'guarantee.' In this way, if the patient has a claim of $30, the price of five bottles, an adjustment can often be made by sending the claimant five more bottles (which cost the concern $5). Therefore, instead of returning $30, the value of the claim, the concern ships 10 bottles at a cost to it of $10, for which it receives $30."

In view of all the evidence in the case, Judge Blessing declared it to be a scheme for obtaining money through the mails by means of false and fraudulent pretenses and recommended that a fraud order be issued against the General Remedies Company and H. N. Gurley. This was done.

Correspondence

THE USE OF INFRA-RED LIGHT THERAPY

To the Editor:—The publication of a number of imitation medical journals by commercial firms prompts me to comment on one which urges us to believe that infra-red therapy is something special and to be obtained in its most efficient form only by using a special and expensive generator of these rays.

All heated substances give off electromagnetic radiations. The hotter they are, the greater the total volume of radiation and the greater the proportion of infra-red rays, although the smaller wave lengths increase more rapidly until we get luminous rays and finally incandescence. The fact that the rays are visible or invisible is unimportant from a therapeutic point of view. The important point is that such radiations penetrate tissue directly as the wave length and wattage and indirectly as the square of the distance and the angle of obliquity from the vertical. Luminous rays are reflected from white skins.

Infra-red rays penetrate deeper because they are longer than luminous ones. Therefore they reach deep tissues, where they are converted into molecular kinetic energy or heat; and heat excites hyperemia, which is the desideratum of our procedure. These rays are not hot air but electromagnetic waves of the ether, just like roentgen rays or radio waves, traveling 186,000 miles a second.

It is impossible to use a heated source for these radiations without producing infra-red rays.

Pacini says (Ultraviolet Therapy, p. 14) that sun rays contain 80 per cent. infra-red energy. The mercury vapor electric arc gives off 52 per cent. infra-red rays. The carbon electric arc generates 85 per cent. infra-red energy, and incandescent electric lamps, 93 per cent. infra-red.

The only way to escape them would be by using colored glass in the green blue region of the spectrum to filter them out.

The question is reduced, then, to which is the cheapest and most practicable source for therapeutic use. As dosage depends also on time of application, a weak source may be

used for a long time or a powerful source for a shorter time. I have, as have others, treated successfully otitis media and mastoiditis by continuous irradiation from 40 watt electric lamps for weeks at a time. A 500 watt lamp can be used for an hour at a time, however.

A cheap and perfectly satisfactory apparatus is the incandescent electric coil heater with copper reflector, greatly strengthened by blackening the reflector.

With any type of radiator, the bare skin of the patient is always placed as close to the source of the radiation as is bearable with comfort. The hand of the physician is a good measurer of tolerance if the patient is a baby.

The patient should not be left alone while taking the treatment. Any treatment that is perfectly fool proof is too weak to be valuable.

Substances that heat by contact are always the most dangerous; e. g., hot water bottles, electric pads, and hot bricks; and if not hot enough to burn, heat only the superficial cutaneous capillary net by conductive heat. The amount of radiant (conversive) heat that they emit is infinitesimal, therapeutically speaking.

FRANK THOMAS WOODBURY, M.D., New York.

QUARANTINE FOR PNEUMONIA

To the Editor:—The Commissioners of the District of Columbia have adopted a quarantine of pneumonia and promulgated a number of regulations including due penalties.

All will agree that pneumonia is infectious, yet it is highly questionable whether any drastic measures will materially affect its incidence. After an extensive experience in treating lobar pneumonia in open wards in which there were other medical cases, I cannot recall a single instance in which one such case had led to an outbreak, or a single case of ward infection. Likewise in private practice it has not been my privilege to see a second member of any family acquire pneumonia as a direct infection from the original case. Also, one rarely finds a nurse contracting pneumonia, yet she is exposed to it frequently, hours at a time. There are other contributing causes than the patient suffering from pneumonia; and one is moved to speculate as to how our health officer is going to control all the pneumococci expectorated daily by persons who are not suffering from pneumonia.

Ten hundred and fifty deaths from pneumonia, in a city of nearly 500,000, means little without an analysis of how many of these represent "the friend of the aged" as well as terminal conditions in other diseases. Not all of them by any means were cases of acute lobar pneumonia.

Again, I hardly knew that the sickroom of any pneumonia patient was ever regarded as the sick man's reception hall. When I read the instructions for handling the linen, I thought I must be reading Osler's instructions in typhoid fever. I'm not old fashioned or opposed to progress, but this appears to me an effort to stem the tide by trying to sweep back the ocean.

R. A. THORNLEY, M.D., Washington, D. C.

[NOTE.—The regulations referred to by Dr. Thornley are, briefly, as given below.—ED.]

The first section declares pneumonia to be a communicable disease "reportable and quarantinable in the District of Columbia."

The second section states that it shall be the duty of every physician to report cases of pneumonia to the health department within twenty-four hours after becoming aware of its existence.

The third section sets forth that it shall be the duty of the person in charge of any patient in the District of Columbia suffering from pneumonia to adopt the following precautions, if said person has power and authority so to do:

"To comfortably isolate the patient, as thoroughly as practicable, from all other persons who are not suffering from the same disease, and who are not necessarily in attendance on the patient, and to maintain such isolation until the recovery or death of the patient.

"To disinfect as promptly as practicable each and every article by or about the patient.

"No bedclothes or other article used by the patient shall be sent into public laundry unless and until it has been boiled or properly disinfected by immersion in some approved disinfecting solution.

"On the termination of quarantine, the sickroom and contents must be thoroughly cleaned, aired and all woodwork renovated before it is again used.

"Any person who violates any of the provisions of these regulations shall be punished on conviction by fine of not less than $10 and not more than $40."

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

TESTS FOR ACIDOSIS

To the Editor:—Please give a practical method for testing for acidosis through Queries and Minor Notes.

F. M. MANSON, M.D., Worthington, Minn.

ANSWER.—The bicarbonate tolerance test of Sellard is one of the most satisfactory clinical tests for acidosis. The test consists in giving the patient 5 gm. of sodium bicarbonate, dissolved in a little water, by mouth every two or three hours until the urine voided before each dose becomes neutral or faintly alkaline to litmus paper.

The urine, according to Todd, is thoroughly boiled before testing. With normal persons the administration of from 3 to 5 gm. of sodium bicarbonate by mouth will cause the urine to become alkaline; in acidosis, very much larger amounts may be given without bringing about this change. A tolerance of from 20 to 30 gm. of sodium bicarbonate indicates a moderate grade of acidosis, which usually produces no clinical symptoms. A tolerance of from 40 to 50 gm., says Todd, is noted in more marked grades but still without symptoms except dyspnea on exertion. With a tolerance of from 75 to 100 gm. there may be very definite and serious symptoms. In extreme cases of acidosis, the tolerance may reach 150 gm.

There are other reliable tests for acidosis which require special equipment and technic; for example, the determination of the carbon dioxid carrying power of the blood by the method of Van Slyke and Cullen, and that of determining the carbon dioxid tension of alveolar air. Sellard's test, however, is simple and furnishes a reasonably accurate index of the degree of acidosis. According to Palmer and Van Slyke, however, it generally indicates a somewhat greater degree of acidosis than really exists, judging by the carbon dioxid combining power of blood plasma.

CONTRACTION OF KNEE JOINT

To the Editor:—A 5 year old boy has a contraction of the hamstring muscles due to infection near the knee joint following scarlet fever, and is unable to extend his leg much more than 135 degrees. He has been anesthetized twice, and considerable force was used to extend the leg, with only partial success. Splints that were applied had to be removed because they failed to maintain extension. There appear to be only two remaining things to do: put on a steel brace with a turnbuckle attachment to maintain a steady pull which can be gradually increased, or some operative procedure by which the muscles can be lengthened. Would you kindly advise me on the following points? What is prognosis if uninterfered with, with steel brace, and from operative measures? Preferably treatment should not necessitate long confinement to bed, as the boy has not yet recovered from three months' illness during which, at one time, little hope was entertained for his recovery.

M.D., Mich.

ANSWER.—The management of a contracted knee following scarlet fever in a child, aged 5 years, should be considered from three standpoints:

1. A contracted knee which still experiences irritation from the disease. The indications here are definite for extension either in the prone position or with a Thomas hip-splint or other form of extension brace. Such treatment, if applied properly, so as to get a gradual graded pull, will accomplish three results: (*a*) It will aid in the cure of the disease; (*b*) at the same time it will straighten the leg, and lastly (*c*) it is a factor in preventing bony ankylosis because it separates the parts of the joint. Such a knee, that is, one in which the condition is acute or subacute, should not have cast or brace fixation until traction has produced the desired angle.

2. A contracted knee which does not show ankylosis, but in which the disease is arrested and the irritation is gone, is the type that should also have gradual extension to stretch

the muscles and soft parts, thus obtaining the maximal correction possible by this method. Often this treatment will give us a straight leg. If, however, an angle of deformity still exists after a reasonable length of time in proper extension, forcible correction with a cast by either of the two following methods should be employed:

(*a*) Frequently properly applied casts, with moderate forcible correction, are advised. A cast from the trochanter to the toes is carefully applied, with enough pressure as the cast sets to cause a moderate amount of inconvenience to the patient. This should be left on from one to two weeks or until the patient's knee is entirely comfortable for two or three days. Then the cast should be removed and another immediately applied in the same way; added correction of the knee will be obtained. These changes should be continued until the desired position is procured.

(*b*) If there is beginning bony ankylosis and some soft tissue stubbornness, forcible correction under anesthetic is advised. The most difficult part of this performance is the judgment of how much force should be used and the proper application of a well fitted, neatly molded, correctly padded cast that will give equal pressure to each square inch of surface. This cannot be accomplished with a brace, and, as Osgood well says, "notwithstanding authoritative statements to the contrary, it is a difficult thing for a surgeon of more than average skill in the use of plaster of Paris to apply an extensive plaster" to a recently diseased and freshly traumatized knee, making the patient "comfortable and avoiding the occurrence of pressure sores."

3. When there is definite ankylosis as shown by the roentgen ray and loss of motion, the angle is best corrected by surgical reconstruction in the lower end of the femur, care being taken not to disturb the knee joint itself.

SUCCUS CINERARIA MARITIMA AND PHYTOLINE

To the Editor:—Can you tell me anything of the Walker Pharmacal Company of St. Louis or their products "succus cineraria maritima" and "phytoline"? Is there such a plant as cineraria maritima and what are its properties? Are these drugs used in homeopathic medicine, or is the whole thing fraudulent? LOIS L. GANNETT, M.D., Watertown, N. Y.

ANSWER.—According to our information, the Walker Pharmacal Company—like the Manola Chemical Company—is or was practically a subsidiary concern of the Luyties Homeopathic Pharmacy Company.

In 1911, the Council on Pharmacy and Chemistry reported (THE JOURNAL, Nov. 11, 1911, p. 1630) that the juice of a plant referred to as cineraria maritima (more correctly described as senecio cineraria, D. C.) was at one time supposed to be of value in the treatment of cataract and certain other affections of the eye. The Council reported that there was no evidence that the drug had any therapeutic value, and quoted from "Ophthalmic Therapeutics" by Casey Wood that "the instillation into the conjunctival sac of a preparation of this or any other member of the Senecio family has about as much effect on the resolution or dispersal of opacities due to organic changes in the lens as pouring the same down the back of the patient's neck!"

Cineraria maritima would long since have been relegated to the limbo of discarded and discredited drugs had it not been for the exploitation of succus cineraria maritima (Walker) by the Walker Pharmacal Company. In 1916 the Walker Pharmacal Company pleaded guilty to the charge, brought under the federal Food and Drugs Act, that the claims made for succus cineraria maritima (Walker) were false and fraudulent (THE JOURNAL, March 17, 1917, p. 864). In 1920 it was pointed out (THE JOURNAL, Oct. 9, 1920, p. 1007) that the government prosecution affected the claims on the label only and that the claims were still made to the medical profession through other avenues.

The advertising circulars issued by the Walker Pharmacal Company have contained such meaningless statements regarding the composition of phytoline as:

> Phytoline is prepared from inspissated juice of the phytolacca berry after having been touched by the early frost. The active principle is retained by subjecting the juice to a process of sun distillation suggested by Prof. W. W. Baxter, and used only by the Walker Pharmacal Co.
>
> According to later advertising, phytoline is prepared
>
> . . . from the fresh juice of the berries of the phytolacca decandra when touched by the first frost. This juice is subjected to a special process of development and preservation. . . .

These claims, when divested of their mystery and improbability, would suggest that phytoline is a tincture of pokeberries. A hunter has reported the shooting of fat pigeons whose gullets were filled with pokeberries.

Medical Education, Registration and Hospital Service

COMING EXAMINATIONS

ALABAMA: Montgomery, Jan. 13. Chairman, Dr. S. W. Welch, Montgomery.

ARIZONA: Phoenix, Jan. 6. Sec., Dr. W. O. Swork, 404 Heard Bldg., Phoenix.

COLORADO: Denver, Jan. 6. Sec., Dr. David A. Strickler, 612 Empire Bldg., Denver.

DISTRICT OF COLUMBIA: Washington, Jan. 13-15. Sec., Dr. Edgar P. Copeland, 104 Stoneleigh Court, Washington.

HAWAII: Honolulu, Jan. 12. Sec., Dr. G. C. Milner, 401 Beretania St., Honolulu.

ILLINOIS: Chicago, Jan. 6-8. Supt. of Regis., Mr. V. C. Michels, Springfield.

INDIANA: Indianapolis, Jan. 13. Sec., Dr. W. T. Gott, 333 State House, Indianapolis.

MINNESOTA: Minneapolis, Jan. 6-8. Sec., Dr. Thomas McDavitt, 734 Lowry Bldg., St. Paul.

NATIONAL BOARD OF MEDICAL EXAMINERS: Written examinations in Class A medical schools. Parts I and II, Feb. 18-20. All applications for this examination must be made on or before January 15. Sec., Dr. J. S. Rodman, 1600 Walnut St., Philadelphia.

NEW YORK: Albany, Buffalo, New York, Syracuse, Jan. 26-29. Chief, Mr. Herbert J. Hamilton, State Education Bldg., Albany.

NORTH DAKOTA: Grand Forks, Jan. 6. Sec., Dr. G. M. Williamson, Grand Forks.

OKLAHOMA: Oklahoma City, Jan. 13-14. Sec., Dr. J. M. Byrum, Shawnee.

OREGON: Portland, Jan. 6-8. Sec., Dr. U. C. Coe, 1200 Stevens Bldg., Portland.

PENNSYLVANIA: Philadelphia, Jan. 27-31. Pres., Dr. I. D. Metzger, 322 Aiken Ave., Pittsburgh.

RHODE ISLAND: Providence, Jan. 1-2. Sec., Dr. B. U. Richards, State House, Providence.

SOUTH DAKOTA: Pierre, Jan. 20. Dir., Dr. H. R. Kenaston, Bonesteel.

UTAH: Salt Lake City, Jan. 6. Dir. of Regis., Mr. J. T. Hammond, State Capital, Salt Lake City.

WASHINGTON: Olympia, Jan. 12. Sec., Mr. Wm. Melville, Olympia.

WISCONSIN: Madison, Jan. 13-15. Sec., Dr. Robert E. Flynn, 315 State Bank Bldg., La Crosse.

South Dakota July Examination

Dr. H. R. Kenaston, director, South Dakota Division of Medical Licensure, reports the oral, written and practical examination held at Sioux Falls, July 15-16, 1924. The examination covered 15 subjects and included 100 questions. An average of 75 per cent. was required to pass. Of the 11 candidates examined, 10 passed and 1 failed. Four candidates were licensed by reciprocity. The following colleges were represented:

PASSED			
College	Year Grad.		Per Cent.
Hahnemann Med. Coll. and Hosp., Chicago	(1895)	86.5,	89.9
Northwestern University	(1923)		86.9
Rush Medical College	(1921)	86.5, (1923)	85.9
Iowa College of Physicians and Surgeons	(1894)		87.3
Sioux City College of Medicine	(1905)		83.2
Ensworth Medical College	(1918)		85.3
Creighton Medical College	(1923)		86.5
University of Buffalo	(1921)		80.3

FAILED		
College	Year Grad.	Per Cent.
Barnes Medical College	(1902)	67.1

LICENSED BY RECIPROCITY		
College	Year Grad.	Reciprocity with
University of Michigan	(1902)	N. Dakota
University of Minnesota	(1923)	Minnesota
Medical College of the State of South Carolina	(1922)	S. Carolina
University of Tennessee	(1912)	Tennessee

North Dakota July Examination

Dr. G. M. Williamson, secretary, North Dakota Board of Medical Examiners, reports the oral, written and practical examination held at Grand Forks, July 1-4, 1924. The examination covered 13 subjects and included 100 questions. An average of 75 per cent. was required to pass. One candidate was examined and passed. Eight candidates were licensed by reciprocity. The following colleges were represented:

PASSED		
College	Year Grad.	Per Cent.
University of Munich, Germany	(1914)	*

LICENSED BY RECIPROCITY		
College	Year Grad.	Reciprocity with
Chicago College of Medicine and Surgery	(1916)	Illinois
Rush Medical College	(1920) Illinois, (1924, 2)	Minnesota
Central College of Phys. and Surgs., Indianapolis	(1905)	Indiana
University of Louisville	(1907)	Louisiana
University of Minnesota	(1920), (1923)	Minnesota

* No grade given.

Book Notices

ELEKTROPHYSIOLOGIE DER PFLANZEN. Von Dr. Kurt Stern. Paper. Price, $2.65. Pp. 219, with 32 illustrations. Berlin: Julius Springer, 1924.

Physiologists who are interested in the comparative behavior of plant and animal cells, tissues and organs will find this volume of interest in the field of electrical response. The book is the fourth volume of the "Monographien aus dem Gesamtgebiet der Physiologie der Pflanzen und Tieren." The first chapter deals with the physical basis of electrophysiology, particularly with the production of electrical energy from other forms of energy within the cells, and the transformation of electrical energy into other forms of energy. Electrical energy may arise from the transformation of chemical, osmotic, mechanical, photic or thermic energy, and may in turn be transformed into such types of energy. The discussion of the way in which these transformations occur forms an introductory chapter of considerable interest to the student of general physiology. The second chapter discusses the physical effects of electric currents, such as cataphoresis, electro-osmose and concentration changes, and the effects on vital processes, such as protoplasmic circulation, contraction and expansion, coagulation and peptization, precipitation and solution, vacuolization, viscosity and permeability changes. Then follow chapters that treat of the quantity of stimulus law, electrotaxis, electrotropism and electronastic responses. These chapters deal with the main facts of immediate response physiology, and the problems are fully treated, possibly more fully than their importance justifies; but research in this field has been active, and more facts are known concerning the direct and visible responses of organisms and organs to electrical stimulation. The most important problems of electrophysiology from the economic point of view must lie in the field of developmental and metabolic influences of electrical stimulation. But in this field less critical methods have been used, and results of real value have seldom been obtained. The treatment is therefore necessarily more brief than the subject deserves. The final chapters discuss the production of electrical energy by plants, and the problems and tasks still ahead of students of vegetable electrophysiology, a discussion that may stimulate valuable work along these lines. The literature citations number about 200, and will assist any one to orient himself in this field of research. The volume is interestingly written, and will prove helpful to those who desire a general view of this special field of physiology, as well as to those who may seriously undertake to investigate the immediate responses of protoplasm, living cells and organs, or the more important developmental and metabolic influences of the electrical conditions surrounding of pervading the living cells of plants.

CHRONIC INTESTINAL STASIS (ARBUTHNOT LANE'S DISEASE). A Radiological Study. By Alfred C. Jordan, C.B.E., M.D., M.R.C.P., Corresponding Foreign Member, Belgian Royal Academy of Medicine. Cloth. Price, $7.50. Pp. 230, with 315 illustrations. New York: Oxford University Press, 1924.

This volume is well written and illustrated. Unfortunately, most physicians do not realize the great importance of chronic intestinal stasis. The author is a radiologist, with a good conception of clinical medicine. He has used all the resources of his specialty in this study. Lane's views are closely quoted and elucidated by fluoroscopic and roentgenographic examination. As stated by the author, so adverse and severe are the changes wrought by stasis that Lane has led us a long way on the road to a correct understanding of the essential unity of disease, and has taught us to regard the organism as a whole. The chapters on the causes of stasis and its clinical manifestations are complete. The usual opaque meal is used for the study, and this is thoroughly carried out. The meal is followed in its normal downward course, and all the patients are given an opaque enema to complete the study. The author has some clever and original ideas for this particular study. Lane was the first to explain that bands attached to the terminal coil of the ileum may cause kinks, and thus induce stasis with its serious consequences. Although there is much in favor of his views, still it does seem extreme to attach so much importance to stasis as the chief factor in the causation of gastric and duodenal ulcer, cardiospasm and a host of other things concerning whose etiology there is, as yet, much room for doubt. The concluding chapter is on treatment. Medicinal remedial measures are strongly recommended, and only in the cases with definite mechanical obstruction does the author advise surgical means.

ESSENTIALS OF PRESCRIPTION WRITING. By Cary Eggleston, M.D., Assistant Professor of Pharmacology, Cornell University Medical College. Third edition. Cloth. Price, $1.50 net. Pp. 146. Philadelphia: W. B. Saunders Company, 1924.

This is intended to provide the student of medicine with a succinct, yet sufficient, treatment of the subject of prescription writing. In the present revision the discussion of Latin grammar has been somewhat amplified. The influence of the Volstead Act on the writing of prescriptions is discussed briefly, and a list has been included showing those official preparations which cannot be prescribed without a permit unless they have active medicinal substances added. The number of practice prescriptions has been doubled. It may be noted that sixty-six pages, or almost half of the little book, is taken up with Latin construction and a consideration of weights and measures. This is not excessive, if a student who does not know Latin or weights and measures is to write Latin prescriptions. But is it really worth while to take so much time for the teaching of an archaic form of expression, leaving so little time for the really important part, the technic of prescribing? Does the modern university-bred medical student need a discussion of weights and measures? And why is the student still drilled in prescribing in the old apothecaries' system when familiarity with one system is all that is required, and the metric system the only one desired?

DIE HETEROGENETISCHEN HAMMELBLUTANTIKÖRPER UND IHRE ANTIGENE. Von Dr. Hans Schmidt, Privatdozent Abteilungsleiter am Behring-Institut Marburg. Paper. Pp. 122. Leipzig, Curt Kabitzsch, 1924.

There are two important exceptions to the law of the species—specificness of the reactions of immunity; namely, (1) organ-specificness, illustrated best by the immune reactions of the crystalline lens, which in large measure are common to the lens in many different species but different from the immune reactions of the blood and other organs, and (2) the so-called heterogenetic antigens and heterophil antibodies (Forssman), of which the best known example is the development of antibodies for sheep corpuscles on injection of rabbits with the cells of the kidney of the guinea-pig. Antigens of this kind have certain peculiarities and specificities. Their number is growing, and there are several indications that such antigen or antigens play the essential rôle in the Wassermann reactions as usually carried out at the present time. Schmidt's book presents well what is known of heterogenetic antigens and heterophil antibodies. It will interest all students of immune reactions.

A MANUAL OF PRACTICAL X-RAY WORK. By John Muir, B.Sc., M.B., Ch.B., Assistant Radiologist, University College Hospital, in collaboration with Sir Archibald Reid, K.B.E., C.M.G., M.R.C.S., Superintendent of Radiological Department, St. Thomas's Hospital, and F. J. Harlow, B.Sc., F.Inst.P., A.R.C.Sc., Principal, Municipal Technical College. Third edition of the Manual by Arthur J. Muir. Cloth. Price, $10. Pp. 524, with 456 illustrations. New York: Paul B. Hoeber, 1924.

This manual covers the range of practical roentgen-ray work in diagnosis in a very satisfying manner. It is thoroughly prepared, and provides the student with detail of text and of illustration which is ample for the present requirements of everyday roentgen-ray practice. As is usual in English or continental works on this particular subject, there is more of the older roentgen-ray apparatus shown and described in this work than would be found in an American presentation of the same subject, as mercury breaks, electrolytic interrupters and gas tubes are "objets d'antique" in modern American roentgen-ray laboratories. It is evident that gas tubes are still much in favor by the roentgenologist across the sea. However, the author gives considerable space

to the details of the Coolidge tube and the Potter-Bucky grid, which stamps the book as of the present day. The illustrations of diseases of bones and joints and of the internal organs are of high order and exceedingly instructive. This is one of several works in English on roentgenology that will not disappoint the seeker for knowledge in this subject.

KYSTOSKOPISCHER ATLAS. Ein Grundriss für Studierende und Aerzte. Von Dr. med. Erich Wossidlo. Third edition. Cloth. Price, 39 Goldmark. Pp. 111, with 96 illustrations. Leipzig: Wilhelm Engelmann, 1924.

Wassidlo has provided the student an opportunity to study the various common and unusual examples of pathologic conditions in the bladder as seen through the cystoscope. The more usual conditions are shown in many illustrations and serve as examples of accuracy and beauty. For class work demonstrations and so-called dry clinics the instructor can make use of them with possibly better result than having the actual patient before the class. The beginner in cystocopy may study here the whole gamut of pathologic changes in the bladder. The text serves in a short concise but thorough manner to explain the illustrations. The plates illustrative of syphilis of the bladder, of fistula of the urachus and of *Bilharzia* are excellent. The illustrations of bladder carcinoma of various types and in various stages deserve special mention among many others which make this atlas stand out as a work of art as well as extreme value as a textbook for any one interested in the subject of cystoscopy.

DISEASES OF THE MALE ORGANS OF GENERATION. By Kenneth M. Walker, F.R.C.S., M.A., M.B., Jacksonian Prizeman and Hunterian Professor, Royal College of Surgeons. Cloth. Price, $4. Pp. 234, with 78 illustrations. New York: Oxford University Press, 1924.

Although there are many advantages in the monograph type of medical textbook, one fails to see why such an artificial division was made as to separate the diseases of the urinary tract from those of the male generative organs. The author has had a large experience. His views as to the etiology of prostatic enlargement, that it is a degenerative change, are somewhat reactionary. One would be inclined also to differ from the view that "cystoscopy in the presence of enlarged prostate is always a serious undertaking." The illustrations, for the major part, are original and helpful. The chapters on the complications of gonorrhea are especially complete, but one misses a discussion of the underlying disease. The operative treatment of nondescent of the testis is not given the attention it deserves, especially in the direction of a series of illustrations of the technic of orchidopexy. There are a number of minor faults, but as a whole the book will be a welcome addition to the library of the urologist because many of the subjects are discussed with far more detail than is customary in the standard textbooks of urology.

STUDENTS' GUIDE TO OPERATIVE SURGERY. By Alfred T. Bazin, D.S.O., M.D., Assistant Professor of Surgery and Clinical Surgery, McGill University. Assisted by F. A. C. Scrimger, V.C., B.A., M.D.; F. J. Tees, M.C., B.A., M.D.; L. H. McKim, M.D., and I. McL. Thompson, B.Sc., M.B., Ch.B., of the Departments of Surgery and Anatomy, McGill University. Cloth. Price, $2.50. Pp. 126. Montreal: Renouf Publishing Company, 1923.

This is intended as a guide to medical students in doing their operating on the cadaver. Brief mention is made of anatomic landmarks and the steps of standard operative procedures. Since the outline includes rather simple fundamental directions, which are usually explained in a few minutes, it would not seem to be an important addition for the student's use.

TRAITÉ ÉLÉMENTAIRE DE CLINIQUE THÉRAPEUTIQUE. Par le Dr. Gaston Lyon. Eleventh edition. Cloth. Price, 85 francs. Pp. 1406. Paris: Masson et Cie, 1924.

This edition of Lyon's classic on clinical therapeutics contains a discussion of the latest diagnostic and therapeutic procedures, with which, the author points out, the physician must "resolutely familiarize himself, to maintain his legitimate rank." This book should be a welcome addition to the library of physicians who can read French, differing as it does in a characteristic manner from the American, English and German books on the subject.

Medicolegal

Employee's Death from Erysipelas Following Vaccination

(Jefferson Printing Co. v. Industrial Commission et al. (Ill.), 144 N. E. R. 356)

The Supreme Court of Illinois, in reversing a judgment that affirmed an award, under the workmen's compensation act, for the death of an employee of the printing company, says that the man was vaccinated by the company's physician in response to a notice sent out by the commissioner of public health of the city of Chicago advising the company to have its employees protected against smallpox by vaccination. The employee worked two or three days following his vaccination, and then remained away for six or eight weeks, after which he returned to work for a short time, but quit again and never returned. On the second day after his vaccination he was examined by a physician, who found erysipelas starting at the point of vaccination on the left arm, which disease developed rapidly and extended to the waist line. About four months after his vaccination, he had a stroke of paralysis which affected his right side, and about six months after the stroke he died from paralysis and an embolism, which the physician testified was doubtless produced by the effect of the erysipelas. A physician called as a witness on behalf of the company expressed the opinion that the indication was that the erysipelas was due to a subsequent infection, although probably the vaccination abrasion was the point of entry. The most that could be said of the testimony of the medical witnesses was that it tended to establish a causal relation between the erysipelas and the employee's subsequent condition and death, but the testimony of the applicant for compensation failed to show a chain of causation extending back to any accident or condition arising out of and in the course of the employment. Such cause and consequence could be shown by circumstantial evidence, but such evidence must amount to more than guess or conjecture. The employee could have been vaccinated at home or at a physician's office in response to the general request of the health officials of the city. The testimony in the record showed that the streptococcus germ is carried in the air everywhere, so that there was apparently no greater liability to infection one place than another. A risk is incidental to the employment only when it belongs to or is connected with what a workman has to do in fulfilling his contract of service. An injury not fairly traceable to the employment as the contributing proximate cause does not arise out of the employment. The causative danger must be peculiar to the work and incidental to the character of the business.

Liability of Husband for Medical Services for Wife

(Simpson v. Drake (Tenn.), 262 S. W. R. 41. Barnes v. Starr (Md.), 124 Atl. R. 922)

The Supreme Court of Tennessee says that in the case of *Simpson* v. *Drake*, as executor of an estate, but one question was submitted for decision: Is the husband primarily liable for the medical bills incurred during the last illness of his wife, and for the burial expenses, where she leaves a separate estate? Under the common law it was the duty of the husband to furnish the wife suitable support, including medical services during her life, and to bury her when she died. Tennessee law goes even further, and makes it a misdemeanor for a husband to fail to provide for his wife, Section 6888a7 of Shannon's Code declaring it to be a misdemeanor for any husband, wilfully and without good cause, to neglect or fail to provide for his wife according to his means, or leave her destitute or in danger of becoming a public charge.

In a number of decisions, in the various states of the Union, based on local statutes, it has been held that the wife's estate is primarily liable for her burial expenses; and a few cases hold her estate liable for medical bills incurred in her last illness. It is also generally held that, where the wife specifically provides in her will for the payment of such expenses out of her estate, it becomes primarily liable therefor. But,

in the absence of such statutory provision, it is uniformly held that these duties devolve on the husband.

In the cause under consideration, therefore, the husband was primarily liable for the medical services rendered his wife in her last illness, and for her burial expenses, though the court is of the opinion that the estate of the wife is liable for her funeral expenses where the husband is insolvent, and where, on account of his poverty, he is unable to discharge such obligation.

The Court of Appeals of Maryland says that the case of *Barnes* v. *Starr* was an action against defendant Barnes to recover for the burial expenses of his deceased wife. With that was combined an action for board, nursing and services rendered to Mrs. Barnes while she was sick and a patient in a hospital, and an action to recover $300 for medical and professional services rendered her by a physician. Judgment was rendered in favor of the plaintiff in each action, and the judgment in each case is affirmed. The law controlling the husband's liability for funeral expenses and for medical attention and service to the wife in her last illness is well settled in Maryland. In *Bliss* v. *Bliss*, 133 Md. 74, 104 Atl. 472, the court said:

> In this state it has been held that the statutes preserving to the wife the ownership and enjoyment of her property do not relieve the husband of his common-law obligation to maintain his wife and to pay for medical attendance upon her and her funeral expenses.

The objection that Mrs. Barnes was living apart from her husband at the time of her death could not avail the defendant in this case, notwithstanding that she had filed a bill of complaint for permanent alimony and that a final order for alimony pending the outcome of the litigation had been made.

Acknowledgment of Fault in Treatment with Radium

(Scott et al. v. Sciaroni (Calif.), 226 Pac. R. 827)

The District Court of Appeal of California, Third District, in reversing a judgment of nonsuit, says that the defendant prescribed and applied radium treatment for fibrous tissue growths on the hands, knees and Achilles tendons of Mrs. Scott. Healing appeared to have followed in the usual time and manner, except in the case of the left leg, where the application was made for a longer time than was prescribed, and at that place there continued to be a raw sore or ulcer at the time of the trial, nearly two years after the treatment. The defendant testified that on one occasion he prescribed an application of radium for three hours, and that his technician, referred to by other witnesses as his nurse, applied it for four hours and twenty minutes, and that if radium is applied considerably too long the healing is all the more difficult. Mrs. Scott testified that the excessive application was made to the tendon of the left leg, the one on which it was contended that a permanent injury was inflicted; that the defendant said he considered it was his fault; not exactly his fault, but the fault of his nurse; that he should have been more careful about letting his nurse handle it; should have applied it himself.

The defendant urged that a physician and surgeon is not a warrantor of cures; that the result of the treatment alone is not sufficient proof of negligence or want of skill; that whether or not a defendant physician and surgeon has been negligent or careless can be tested, ascertained and determined only from testimony given by physicians and surgeons practicing the same methods as the defendant; and that in this case there was no such indispensable expert evidence that the treatment of Mrs. Scott by the defendant was in any way responsible for the injuries complained of. For the purposes of this case, at least, all the foregoing propositions except the last may be conceded. The defendant himself was an expert in the methods of treatment employed by him. The testimony as to his admissions that he "left the radium on too long" and that "it was his fault that she was in the condition she was in," when considered in connection with proof of the long-continued intense pain suffered and the failure of the burned part to heal, constituted sufficient expert evidence to require the submission of the case to the jury. If the defendant had admitted that the injury complained of was caused by his negligence, it would hardly be contended that the evidence was insufficient to go to the jury. In the sense in which the word "fault" was used in the foregoing admissions, it was synonymous with "negligence."

The defendant contended that his admissions were not sufficient to supply the necessity for expert medical testimony; and that some of the admissions were made by him during an attempt to compromise, rendering them inadmissible in evidence against him. But the admissions were of distinct facts, stated positively and not hypothetically, and were admissible in evidence, even though made in the course of an attempted compromise. Again, the defendant argued that declarations and admissions are the weakest kind of evidence. The argument goes only to the credibility of the witnesses testifying to the admissions and the weight of the evidence, questions which do not arise on a motion for a nonsuit. The question here was whether the evidence, assuming its absolute verity, was legally sufficient to support a judgment for the plaintiffs.

When an Injury Develops at Once and is Continuous

(Rubin v. Central Business Men's Association (Kan.), 226 Pac. R. 764)

The Supreme Court of Kansas, in affirming a judgment in favor of the plaintiff on an accident insurance policy, says that the policy insured him against loss resulting from bodily injuries, "if such injuries, independently and exclusively of all other causes, shall wholly and continuously disable the insured from the date of accident from performing any and every kind of duty pertaining to his occupation." The evidence tended to show that about July 1 the plaintiff injured his great toe by striking it against the furniture with such force as to drive the nail into the flesh, and for about ten days the plaintiff was unable to conduct his business; that from about July 13 for about ten days he was able to be about the office and perform his work, when a pyogenic infection developed, requiring him to go to the hospital, where he remained for some time and was operated on several times. The policy had a rider attached indemnifying for injury from pyogenic infection resulting from an accident; but the defendant contended that the plaintiff was not continuously disabled longer than the first ten days after the accident, and that any loss of time after that was not covered by the policy. However, the evidence was that pyogenic germs do not develop at once from an injury, but require time in the natural course of events for their development; and the court holds that an injury develops at once and is continuous, within the meaning of a policy of this character, when it follows directly from the accidental hurt within such time as the processes of nature consume in bringing the person affected to a state of total incapacity to prosecute every kind of business pertaining to his occupation. Hence the fact that it took ten days or more for the injury to develop in its ordinary course to such an extent that the plaintiff was wholly incapacitated from performing any of his duties did not prevent the injury from being immediate and continuous within the meaning of the policy.

Society Proceedings

COMING MEETINGS

American Pathological Society, Washington, D. C., Dec. 29-31. Dr. E. B. Krumbhaar, Chestnut Hill, Philadelphia, Secretary.

American Pharmacological Society, Washington, D. C., Dec. 29-31. Dr. E. D. Brown, University of Minnesota, Minneapolis, Secretary.

American Physiological Society, Washington, D. C., Dec. 30-Jan. 1. Dr. Charles W. Greene, University of Missouri, Columbia, Mo., Secretary.

American Society of Biological Chemistry, Washington, D. C., Dec. 29-31. Dr. Victor C. Myers, New York Post-Graduate Medical School, New York, Secretary.

Federation of American Societies for Experimental Biology, Washington, D. C., Dec. 29-31. Dr. E. B. Krumbhaar, Chestnut Hill, Philadelphia, Secretary.

Society of American Bacteriologists, Washington, D. C., Dec. 29-31. Dr. J. M. Sherman, Dairy Industry Building, Ithaca, N. Y., Secretary.

Southern Section of American Laryngological, Rhinological and Otological Society, Jacksonville, Fla., Jan. 19. Dr. H. Marshall Taylor, 111 West Adams St., Jacksonville, Chairman.

Current Medical Literature

AMERICAN

The Association library lends periodicals to Fellows of the Association and to individual subscribers to THE JOURNAL for a period of three days. No foreign journals are available prior to 1920, nor domestic prior to 1923. Requests should be accompanied by stamps to cover postage (6 cents if one and 12 cents if two periodicals are requested).

Titles marked with an asterisk (*) are abstracted below.

American Journal of Diseases of Children, Chicago

28: 527-688 (Nov.) 1924

*Diagnosis of Dilatation of Bronchi in Children by Means of Injection of Iodinized Oil. P. Armand-Delille, Paris, France, and C. F. Gelston, San Francisco.—p. 527.

*New Methods for Making Esophageal Strictures Visible and Photographing Them. A. Pollerman, New York.—p. 549.

*Hypoglycemia and Acidosis in Fasting Children with Idiopathic Epilepsy. I. B. Shaw, San Francisco, and M. Moriarty, Boston.—p. 553.

*Nonrachitic Softening of Ribs in Infants and Children. A. F. Hess, New York.—p. 568.

*Relation of Calcium and Phosphorus in Diet to the Absorption of These Elements from Intestine. W. J. Orr, L. E. Holt, Jr., L. Wilkins and F. H. Bunne, Baltimore.—p. 574.

*Peristolic Function; Significance in Cases of Pylorospasm and Habitual Vomiting. J. L. Rogatz, New York.—p. 582.

*Acute Hemorrhagic Nephritis and Acute Hemorrhagic Encephalitis Following Varicella. M. B. Gordon, Brooklyn.—p. 589.

Heart Block in Child of Ten Years Following Trauma to Precordium. W. Robenson, New York.—p. 594.

Review of Literature on Whooping Cough for Last Five Years, from 1919 to 1924. L. W. Smith, Boston.—p. 597.

Diagnosis of Dilatation of Bronchi in Children.—From 8 to 10 c.c. of iodinized oil were injected intratracheally by Armand-Delille and Gelston after 5 per cent. procain anesthesia. This suffices as a rule to inject the bronchial tree of one lung, in children aged from 7 to 14 years, and requires from six to eight minutes or less. The child is then immediately radiographed in a horizontal position. Fluoroscopy will demonstrate if there has been sufficient oil injected. There is no hemorrhage and no dressing is needed. Radiographs are then made in the vertical position. This method has been practiced without any accident whatsoever. Aside from the great diagnostic interest presented by this method of intratracheal injections of iodinized oil in children, emphasis should be placed on the fact that it is entirely innocuous and further holds out the hope of perhaps having a therapeutic application of some considerable value. From all standpoints, this method having already been proved efficient and of no danger, promises to furnish valuable and important information regarding the normal and pathologic appearance of the bronchial tree in children.

Visualizing Esophageal Strictures.—Pollerman passes a rubber tube sealed at one end into the esophagus, withdraws the bougie and inflates the tube. In consequence of the inflation, the walls of the tube conform closely to the walls of the esophagus and, owing to the contained lead, permit the observation of the esophageal walls and of any strictures or other deformities which are present. In the cases in which the tube cannot be used, an alternative technic consists in the administration of a suspension of bismuth subcarbonate in an emulsion composed of: oil of bitter almond, 8 parts; gum arabic, 4 parts, and water, 8 parts.

Hypoglycemia and Acidosis in Epileptic Children.—It is shown by Shaw and Moriarty in a series of five epileptic children that from ten to fourteen day fasts were accompanied by (1) an increase in blood uric acid; (2) moderately marked acidosis, as indicated by (*a*) acetone excretion in the breath; (*b*) diminished alkali reserve; (*c*) moderate fall in p_H of the plasma; (3) a striking decrease in the blood sugar; (4) a slight diminution in degree of acidosis and rise in the blood sugar during latter days of fast. It is suggested that the diminution of blood sugar indicates the greater ease of depletion of carbohydrate stores in childhood, and helps to explain the increased tendency to acidosis.

Nonrachitic Softening of Ribs.—Softness of the ribs and of the anterior thoracic wall, Hess says, is not necessarily a sign of rickets, although it may be brought about or intensified by this disorder. It is associated preeminently with the atrophic in contradistinction to the well nourished infant, two groups which should be differentiated in considering rickets. Infants who have never had rickets may nevertheless show softening of the ribs. It is found frequently in the new-born, especially those born prematurely, and may persist for years. In these cases there can be no question of a rachitic origin. Finally, it is not alleviated or cured by prolonged treatment with the two specifics for rickets, cod liver oil or ultraviolet irradiation.

Relation of Calcium and Phosphorus in Diet to Their Absorption.—It is shown by Orr et al. by metabolism studies that excessive amounts of calcium in the diet tend to increase the total absorption and retention of calcium, but tend to impair phosphorus retention. Excessive amounts of phosphorus in the diet exercise an unfavorable influence on the calcium metabolism, and are accompanied by an increase in the calcium lost in the feces. The retention of one element in the intestine by an excessive amount of the other in the diet is best explained by the formation of insoluble phosphates of calcium which cannot be absorbed.

Peristolic Function in Pylorospasm.—Two typical cases and their charts are presented by Rogatz which indicate the striking results obtainable with thick cereal feedings. A mechanical explanation for vomiting in pylorospasm, and in habitual vomiting due to various causes, is offered as the logical basis for a thick therapy in these cases. This mechanical basis for vomiting in infants is directly associated with the existence of peristolic function, which manifests itself in the infant stomach as a capacity for surrounding and grasping a food content of thick consistency. The practical significance of the peristolic function in the infant stomach is discussed, so far as it is directly responsible for the successful use of thick cereals.

Hemorrhagic Nephritis and Hemorrhagic Encephalitis Following Varicella.—A boy, aged 6 years, following a mild attack of varicella, developed hematuria, nitrogen retention, coma, convulsions, right hemiplegia, right facial paralysis, loss of speech and of hearing. He recovered his speech and hearing and made an almost complete recovery from the paralysis but later showed mental and psychic changes. It was felt by Gordon that there were two distinct and different pathologic conditions present, acute hemorrhagic nephritis and acute hemorrhagic encephalitis, the major part of the cerebral hemorrhage occurring in Broca's area.

American Review of Tuberculosis, Baltimore

10: 117-225 (Oct.) 1924

*Heliotherapy in Treatment of Pulmonary Tuberculosis. H. LoGrasso and F. C. Balderrey, New York.—p. 117.

*Heliotherapy in Tuberculous Spondylitis. E. H. Bruns, Denver.—p. 132.

Noneffect of Irradiation with Mercury Arc on Production of Agglutinins for Tubercle Bacilli. O. Barkus, Perrysburg, N. Y.—p. 141.

*Ultraviolet Light. I. Effect of Quartz-Mercury-Vapor Irradiations (Alpine Quartz-Light) on Experimental Tuberculosis of Cornea in Rabbits. E. Mayer and M. Dworski, Saranac Lake, N. Y.—p. 146.

*Id. II. Action of Quartz-Mercury-Vapor Irradiation on Inhalation Tuberculosis in Primarily Infected and Sensitized Guinea-Pigs. E. Mayer and M. Dworski, Saranac Lake, N. Y.—p. 157.

Id. III. Bactericidal Action of Mercury-Quartz-Vapor Light Irradiation. E. Mayer and M. Dworski, Saranac Lake, N. Y.—p. 166.

Id. IV. Bactericidal Effect of Mercury-Quartz-Vapor Light Irradiation of Blood Circulating in Vitro. M. Guttmacher and E. Mayer, Saranac Lake, N. Y.—p. 170.

Graphic Method of Reporting Chest Roentgenograms. J. W. Weber, Ray Brock, N. Y.—p. 175.

*Reasons for Frequent Occurrence of Tuberculosis at Apices of Lungs. J. Walsh, Philadelphia.—p. 177.

*Tuberculosis Mortality in Relation to Pasturization of Municipal Milk Supplies. C. E. A. Winslow and C. E. Gray, New Haven, Conn.—p. 186.

New Sterilizer for Sputum. J. L. C. Wortman, Amsterdam, Holland.—p. 206.

Method of Teaching Students Diagnosis of Pulmonary Tuberculosis. I. Kaufman, Philadelphia.—p. 210.

Heliotherapy in Treatment of Pulmonary Tuberculosis.—Heliotherapy is regarded by LoGrasso and Balderrey as being of the greatest value in the treatment of pulmonary tuberculosis, one of the most marked benefits noted being the striking improvement in the general physical condition. The blood picture is improved, as is evidenced by an increase in hemoglobin, a diminution in the leukocytosis and a corresponding increase in the lymphocytes. It lessens the activity

of the pulmonary lesion, as indicated by the subsidence of fever, reduction in pulse rate, decrease in moisture, cessation of night sweats, decrease in amount of sputum and greater ease in expectoration. It greatly favors the absorption of exudates as in pleurisy with effusion, hydropneumothorax and pyopneumothorax, in which complications, after the acuteness has subsided, heliotherapy has proved of inestimable value. It is the treatment of choice in so-called surgical tuberculosis or, better, extrapulmonary tuberculosis. It changes the mental attitude of the patient, and facilitates his recovery by making his treatment a pleasure rather than a distasteful necessity. According to their experience heliotherapy will not provoke hemoptysis, increase the activity of a lesion, or reactivate it if judiciously employed. Moderate elevations of temperature, not due to acute complications, do not preclude its use, but the authors recognize as contraindications tuberculosis in the very active stage, marked toxemia and the acute miliary form of the disease. These observations are based on a large number of cases.

Heliotherapy in Tuberculous Spondylitis.—From his experience in treating tuberculous spondylitis, Bruns believes that the conservative hygienic, postural and heliotherapy method gives excellent results. An ankylosing operation is only to be considered as an incident in the treatment, in no way modifying the conservative policy. Psoas abscesses do not necessarily impair the prognosis unless permitted to rupture and become infected. Patients with psoas abscesses, which are aspirated under aseptic conditions, seem to do surprisingly well. Cases of Pott's disease, not correctly treated, usually develop deformities and multiple mixed-infection fistulas, with a grave prognosis, while those placed under a proper regimen do not have these complications, and they almost invariably recover. Aside from its pronounced therapeutic effects, heliotherapy more than any other one procedure gains the cooperation of the patient, and carries him successfully through a tedious and prolonged treatment back to health.

Effect of Ultraviolet Light on Tuberculous Lesion.—Mayer and Dworski believe that their experiments show that the ultraviolet light has definitely influenced the healing of the corneal tubercle of rabbits' eyes.

Effect of Ultraviolet Light on Inhalation Tuberculosis.—Experimental tuberculosis of guinea-pigs was not materially influenced by the irradiations. The intracutaneous reactions correlated rather closely with the necropsies, and both indicated, with few exceptions, steady progression of the disease. From the findings no conclusive deductions are made by Mayer and Dworski on the use of light irradiations in patients.

Reasons for Occurrence of Apical Tuberculosis.—Walsh says on account of the special mucous membrane with its moisture and ciliated epithelium, the labyrinthine passageway, and the residual air, it is extremely difficult for particles to reach the termini of the respiratory parenchyma, but the possibilities of reaching them at the apex are greater than elsewhere, on account of the naturally more active alveoli, the straightness of the paravertebral bronchus, and the failure of the heart-beat interference in the upper lobe; and the possibilities of reaching the right lung are greater than the left on account of the suction being greater, due to its larger size, and the fact that the upper-lobe bronchus is the highest one of the large bronchial branches, giving its current of air the greatest pressure and velocity. The right apex is the first part of the lung to be inflated on inspiration, and the last to be deflated on expiration.

Tuberculosis Mortality in Relation to Pasteurized Milk.—Winslow and Gray assert that the death rate from nonpulmonary tuberculosis of infants in cities which have a thoroughly pasteurized milk supply cannot in any considerable degree be due to bovine infection. It appears, therefore, that infection from human sources alone may account in infants for a nonpulmonary tuberculosis rate of about 130 per hundred thousand combined with a pulmonary rate of about 60 per hundred thousand, the total mortality from tuberculosis being slightly greater than that which obtains at ages 20 to 29. Bovine infection would seem today to be of negligible importance among infants in large cities where the infant-welfare campaign has been vigorously carried on. At the age period from 1 to 4 years, on the other hand, variations in nonpulmonary tuberculosis are strikingly correlated with the extent of commercial pasteurization. The group of cities having less than half their milk supply pasteurized in 1920 show an increase of 13 per cent. in mortality from nonpulmonary tuberculosis at this age period. The cities which attained the pasteurization of nine tenths of their milk supply, either between 1915 and 1920 or shortly after 1920, show a slight reduction. The cities which had reached this degree of pasteurization before 1915 show a 34 per cent. reduction in nonpulmonary tuberculosis at this age period. It would thus appear that, from the standpoint of the results attained in the reduction of nonpulmonary tuberculosis at ages 1 to 4, the practice of pasteurization has begun to yield fruits which are susceptible of statistical demonstration.

Archives of Dermatology and Syphilology, Chicago

10: 537-672 (Nov.) 1924

My Ideal Clinic for Diseases of Skin. H. P. Towle, Boston.—p. 537.
*Calcium Content of Blood in Various Diseases of Skin. H. J. Schwartz and O. L. Levin, New York.—p. 544.
*Effects of Nonspecific Protein Therapy in Syphilis. S. S. Greenbaum and C. S. Wright, Philadelphia.—p. 551.
Myeloid Leukemia of Skin. J. L. Tenenbaum, New York.—p. 557.
*Studies of Fusiform Bacilli and Spirochetes. XI. Distribution About Genitalia of Normal Women: Significance in Certain Genital Infections and Tumors. I. Pilot and A. E. Kanter, Chicago.—p. 561.
Scrofuloderma Gummosa (Tuberculosis Colliquativa). H. E. Michelson, Minneapolis.—p. 565.
*Universal Leukemia Cutis. H. L. Keim, Ann Arbor, Mich.—p. 579.
Wassermann Test. XII. Effect of Intramuscular Injection of Neo-Arsphenamin on Wassermann Reaction. D. L. Belding and R. H. Holmes, Boston.—p. 601.
Relation of Silver Arsphenamin to Involuntary Nervous System and to So-Called Nitritoid Crisis. I. Rosen, E. F. Muller and C. N. Myers, New York.—p. 607.

Blood Calcium in Various Skin Diseases.—In the conditions of acne, eczema, furunculosis and folliculitis barbae, a noticeable decrease in blood calcium was found by Schwartz and Levin in several patients. In some cases of eczema and furunculosis associated with a low blood calcium, decided improvement resulted from the internal administration of parathyroid and calcium lactate, and the improvement was associated with an increase in the amount of blood calcium. Of thirteen cases of urticaria examined, only one gave a low blood calcium. Three cases of angioneurotic edema gave normal figures. On the other hand, two cases of purpura and two of erythema multiforme gave distinctly low figures. In three cases of dermatitis actinica (cases showing a marked hypersusceptibility to sunlight), the blood calcium was distinctly low. Apparently examinations of the blood from patients suffering from various dermatoses do not reveal any positive relationship between the calcium content of the blood and the skin disease.

Nonspecific Protein Therapy in Syphilis.—In the eight cases reported by Greenbaum and Wright, nonspecific protein therapy favorably influenced the course of syphilis. If the effect of the injections is to stimulate the natural protective forces of the body, the use of nonspecific protein therapy as an adjunct to specific therapy may be of decided value.

Fusiform Bacilli in Smegma Secretion of Women.—According to Pilot and Kanter, fusiform bacilli, as well as spirochetes, are frequently present in the smegma secretion of a normal woman. They are usually absent in the cervix and vaginal tract. They play no rôle in the production of leukorrhea. They are important infecting agents in syphilitic lesions of the vulva, erosive and gangrenous vulvitis, condylomata acuminata, necrotic fibroids and carcinoma of the uterus and vagina. Infection with these organisms is characterized by necrosis and foul odor. The presence of these organisms normally would indicate that many ulcerative processes about the genitalia are due to autogenous infection and are not necessarily the result of bacteria from other sources.

Universal Leukemia Cutis.—A case of universal leukemia cutis is presented by Keim with clinical, histopathologic and

hematologic evidence of lymphatic leukemia. From a study of this patient and other cases of leukemia, mycosis fungoides, lymphosarcoma and Hodgkin's disease, it would seem to Keim that these diseases are genetically related pathologically, and may be grouped under the head of the "lymphoblastomata." If such classification is justifiable, then the cutaneous pictures associated with these diseases must be regarded as the variable cutaneous expressions of the "lymphoblastomas."

Boston Medical and Surgical Journal

191: 961-1008 (Nov. 20) 1924

*Principles of Intraperitoneal Drainage. F. H. Lahey, Boston.—p. 961.
Some Urgent Surgical Conditions of Abdomen. H. P. Stevens, Boston.—p. 963.
Clinical Study of Deficient Anterior Pituitary Functioning in Women. J. Perkins, Providence, R. I.—p. 973.
Visual Fields in Pituitary Disease: Case Showing Influence of Endocrine Therapy. W. D. Rowland, Boston.—p. 977.
Mercurochrome-220 Soluble; Intravenously; Case Reports. D. S. Adams, Worcester.—p. 981.

Principles of Intraperitoneal Drainage.—Lahey points out that the principles of intraperitoneal drainage are largely that the drains produce walling off adhesions about a septic area as soon as possible and establish a sinus down to that infected area. Drainage for intraperitoneal infection is of value only when that process is so local that it can be made extraperitoneal by the walling off adhesions which surround the drain. It is desirable to allow drains to remain in place long enough to produce a satisfactory sinus down to the area to be drained. It is important that drains be so placed as to avoid adhesion within the loops of small intestines. The most desirable type of drain for general use in intra-abdominal drainage is the cigaret drain.

Iowa State Medical Society Journal, Des Moines

14: 485-528 (Nov. 10) 1924

Affections of Nose and Throat. E. Mayer, New York.—p. 485.
*Conservation of Vision in Children. R. R. Snyder, Des Moines.—p. 491.
What Progress is Being Made in Treatment of Cancer. B. B. Davis, Omaha.—p. 494.
Relation of Respiration and Circulation. G. C. Robinson, Nashville.—p. 501.
Surgery of Spastic Paralysis. F. J. Gaenslen, Milwaukee.—p. 504.
Clarinda Hospital for Insane. G. H. Hill, Clarinda.—p. 509.
Vincent's Angina or Trench Mouth. G. O. Doane, Des Moines.—p. 511.
*Luminal in Treatment of Epilepsy. G. M. Sawyer, Woodward.—p. 513.

Conservation of Childrens' Vision.—Snyder urges (1) the enactment of laws compelling parents or guardians to comply with notices to provide refractory aid for children with poor eyesight; (2) the extension of eye clinics and conservation of vision classes to all cities and into rural schools; (3) the codification and unification of all state laws regarding defective vision, and (4) the enactment of some measures compelling eye tests in public schools.

Luminal for Epilepsy.—Sawyer claims good results from the use of luminal to control convulsions in epilepsy. She has used the drug in hundreds of cases and has not found any contraindications to its use nor has she seen any harmful effects from its administration. It is not habit-forming.

Journal of Comparative Psychology, Baltimore

4: 447-513 (Oct.-Dec.) 1924

Studies of Emotional Reactions. II. General Behavior and Facial Expression. C. Landis, Minneapolis.—p. 447.

Journal of Metabolic Research, Morristown, N. J.

4: 255-451 (Sept.-Oct.) 1923

*Glucose Tolerance: Value in Diagnosis. II. H. J. John, Cleveland.—p. 255.
*Urine Sugar: Relation to Blood Sugar. H. F. Höst, Kristiania.—p. 315.
Corrections for Gas Volumes for Altitudes 700 to 600 Mm. H. Gauss, Denver.—p. 415.
*Experimental Studies in Diabetes. V. Acidosis. F. M. Allen and A. H. Ebeling, New York.—p. 423.
Auscultatory Estimation of Blood Pressure of Dogs. F. M. Allen, Morristown, N. J.
Restoration of Hydropically Degenerated Cells of Pancreatic Islands in Dogs Under Insulin Treatment. E. F. F. Copp and A. J. Barclay, Morristown, N. J.—p. 445.

Glucose Tolerance.—The findings in this second series of 100 cases in which glucose tolerance estimations have been made by John practically coincide with those of the first series. In the nondiabetics the maximum increase in the blood sugar concentration appeared very promptly after the ingestion of glucose, in 58.1 per cent. (50.9 per cent. in the first series) in one-half hour; in 33.2 per cent. (36.8 per cent. in the first series) in one hour; and in only 8.3 per cent. in 2 hours. In the diabetics the rise in the blood sugar concentration was slow, as was also the return to the normal level. In only 3.8 per cent. (4.6 per cent. in the first series) did the maximum rise appear one-half hour after ingestion of glucose; in 15.4 per cent. (32.5 per cent. of the first series) it appeared at the end on one hour; in 54 per cent. (49 per cent. of the first series) it appeared at the end of three hours and in 3.8 per cent. at the end of the fourth hour. The maximum increase in blood sugar concentration in all the cases was reached at the end of one-half hour in 30 per cent. (31 per cent. of the first series) of the cases.

Urine Sugar and Blood Sugar.—In a series of healthy persons, a number of "transition cases," and a number of diabetics, the fermentable carbohydrate of the urine was estimated by Höst under various conditions and also its relation to clinical glycosuria and the blood sugar. The findings are reported on at length. The effect of various foods on blood and urine sugar was also studied. Investigations into the nature of the physiologic urine sugar showed that at any rate the major portion of the fermentable carbohydrate of the urine is not glucose, and that it must be regarded as doubtful whether glucose is a normal urinary constituent at all. Höst distinguishes between two kinds of sugar excretion in the urine: (1) Physiologic sugar excretion, which has no relation to the amount of glucose in the blood and which comprises sugars whose nature is not known, but which probably do not include glucose. After meals consisting of bread, as well as in urine which is concentrated, these physiologic sugars may occur in such quantities that the reduction reactions commonly employed are positive. (2) Pathologic sugar excretion, caused by the passage of the glucose of the blood into the urine when the blood sugar concentration exceeds the renal threshold.

Experimental Studies in Diabetes.—The susceptibility of dogs to ketosis with fasting and phlorhizin was not obviously altered by the Eck fistula. The doctrine of the exclusive or predominant formation of acetone bodies in the liver, which seems contrary to the best modern conceptions of metabolism, is therefore not supported by these experiments.

Philippine Journal of Science, Manila

28: 111-286 (Aug.) 1924

Birds of Ilocos Norte Province, Luzon. R. C. McGregor.—p. 111.
*Chemotherapeutic Experiments with Chaulmoogra and Allied Preparations. IV. Growth Inhibiting Activity of Certain Organic Compounds Toward Acid-Fast Bacilli in Vitro. O. Schöbl.—p. 123.
*Id. V. Mechanism and Nature of Growth Inhibiting Effect of Chaulmoogra and Other Vegetable Oils. O. Schöbl.—p. 135.
Detection of Traces of Alkali or Soap in Refind Cocoanut Oil. W. L. Brooke.—p. 135.
Tooth of Fossil Shark from Tamboron Island, Near Southern Mindanao. A. N. Kryshtafovich.—p. 155.
Classification of Philippine Components of Coleopterous Family Cleridae. E. A. Chapin.—p. 159.

Growth Inhibiting Activities of Certain Compounds Toward Acid-Fast Bacilli.—Schöbl made a survey of certain organic compounds, belonging to various groups, with regard to their growth inhibiting activity toward acid-fast bacilli. The compounds investigated were acids, alcohols, aldehyds, hydrocarbons, amino compounds, phenols, ethers and terpenes. In part, the results obtained were as follows: Water soluble compounds showed an antiseptic effect, whereas the fat solvents, such as benzene, toluene, xylene, carbon trichlorid and carbon tetrachlorid, which have a strong hypnotic effect, were found to be only slightly antiseptic, or not at all. Sodium, copper and nickel salts of fatty acids were found about equally effective, whereas zinc, strontium, lead and uranium salts showed no effect. The double-bond-containing compounds all showed antiseptic effect, the double bond being more effective on the side-chain than on the ring in aromatic

compounds. Unsaturated alcohols showed an antiseptic effect, particularly when containing the phenyl group which proved to be the most powerful toxic group. High alcohols approaching waxes showed no effect. Secondary alcohols were equally or less effective than primary alcohols. Hydroxy compounds are highly antiseptic toward acid-fast organisms, as they are toward other bacteria. The antiseptic effect of phenols increases with the number of hydroxyl groups, the position of these groups being of importance, as the ortho compounds are more antiseptic than the para or meta compounds.

Nature of Growth Inhibiting Effect of Chaulmoogra and Other Vegetable Oils.—An inquiry made by Schöbl into the mechanism and nature of the growth inhibiting effect of chaulmoogra and other vegetable oils mentioned in the preceding abstract showed that the degree of unsaturation of vegetable oils which stimulate the growth of acid-fast bacteria and of those which inhibit the growth of acid-fast bacteria has no relation to their growth stimulating or growth inhibiting activity. The growth stimulating effect of certain vegetable oils is due to the glyceryl and not to the acid part of the oil. The condition of unsaturation of the oils containing the acids from the chaulmoogra series and of the oils which stimulate the growth of acid-fast bacteria is paramount. Saturated chaulmoogra oil lacks the growth inhibiting activity toward acid-fast bacteria which is possessed by the unsaturated oil. The growth inhibiting activity of chaulmoogra oil depends on the structure of the ring of the fatty acids. When the structure of the ring is changed by saturation with hydrogen the oil loses this biologic property. There are indications that, due to physical properties, acids from the chaulmoogric series containing a short side chain are more effective in vitro than are those having a long side chain. Acid-fast bacteria adapt themselves to the acids from the chaulmoogric series in due time and then withstand larger doses than they did originally.

Public Health Journal, Toronto

15: 441-487 (Oct.) 1924

*Child Guidance Clinic. G. S. Mundie and B. Silverman, Montreal, Quebec.—p. 441.
Clinic for Women and Children. G. H. Pearson.—p. 452.
Prevention and After-Care of Acquired Heart Disease in Children. H. P. Wright, Montreal, Quebec.—p. 456.
*Social Hygiene in Relation to Public Health. D. V. Currey, St. Catharines, Quebec.—p. 460.

Child Guidance Clinic.—Mundie and Silverman point out that the child guidance clinic has demonstrated that institutions for the feebleminded are an absolute necessity. Such institutions would gradually assume responsibility for the large number of mental defectives who, under the present circumstances, are left to their own resources. There should be adequate educational facilities not only for the normal child, but special classes for the backward, retarded and neurotic children.

Social Hygiene in Relation to Public Health.—Currey believes that if we are ever to approach social hygiene and attempt to control venereal disease, each medical officer of health must start in his community to educate, first, the physicians and through them the thinking people. Every case of venereal disease must be placed under treatment and kept there until cured or until noninfective. Sex hygiene must be taught the young people, preferably at home, so that the next generation may avoid the dangers of the present one, and none of these plans can succeed until each health officer does his share of the work and cooperates with his fellow workers in other municipalities.

Tennessee State Medical Association Journal, Nashville

17: 181-209 (Oct.) 1924

Treatment of Renal and Ureteral Stones. O. S. McCown, Memphis.—p. 181.
Prevention of Heart Disease. W. H. Witt, Nashville.—p. 185.
Management of Heart Conditions in Children. J. T. Barbee, Knoxville.—p. 189.
New Test for Sugar. J. B. Steele and E. N. Haller, Chattanooga.—p. 197.
Increased Intracranial Tension. L. B. West, Chattanooga.—p. 199.
Lye Strictures of Esophagus. R. McKinney, Memphis.—p. 205.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

Annals of Tropical Medicine and Parasitology, Liverpool

18: 243-413 (Oct. 31) 1924

Ascarids of Dog and Cat. E. L. Taylor.—p. 243.
*Craw-Craw in Sierra Leone. B. Blacklock.—p. 253.
Mosquitoes of Accra. A. Ingram and J. W. S. Macfie.—p. 263.
Possible Intermediate Host of Schistosoma Haematobium in Gold Coast. A. Ingram.—p. 265.
Croonian Lectures on Leprosy. L. Rogers.—p. 267.
Ravages Caused by Fly of Goloubatz in Roumania; Its Attacks on Animals and Man. T. Ciuca and G. Diulouro.—p. 323.
Sources of South African Tromatodes. F. G. Cawston.—p. 343.
*Value of Urinary Examinations in Diagnosis of Malaria. R. M. Gordon.—p. 351.
Descriptions of New Mosquitoes from South America. A. M. Evans.—p. 363.
Some African Ceratopogoninae Species of Genus Lasiohelea. A. Ingram and J. W. S. Macfie.—p. 377.
Review of Oesophagostomes in Collection of Liverpool School of Tropical Medicine. H. Thornton.—p. 393.
Sauroleiva Agamae, a Filarioid Parasite of Lizard Agama Colonorum. J. W. S. Macfie.—p. 409.

Craw-Craw.—The disease called craw-craw in Sierra Leone is identical with scabies. The parasite which gives rise to it is identical morphologically with *Sarcoptes scabiei*.

Urobilin and Albumin in Urine in Malaria.—While no individual urine test was found by Gordon to have any real value as an aid in the diagnosis of malaria, a combination of urobilin and albumin in the urine, although no certain proof, is considered as being at least strong evidence in favor of malarial infection; whether such evidence is strong enough to warrant immediate treatment with quinin is a matter which can only be decided by the exigencies of the case and the opinion of the physician.

Bristol Medico-Chirurgical Journal

42: 165-216 (Oct.) 1924

Condition Response. C. L. Morgan.—p. 172.
Auricular Failure. C. F. Coombs and C. E. K. Herapath.—p. 180.
Suggestions in General Surgery. C. F. Walters.—p. 202.

British Journal of Ophthalmology, London

8: 497-560 (Nov.) 1924

Cataract in Dystrophia Myotonica (Myotonia Atrophica). W. J. Adie.—p. 497.
Bilateral Chronic Affection of Endothelial Face of Cornea of Elderly Persons. B. Graves.—p. 502.

Indian Journal of Medical Research, Calcutta

12: 1-229 (July) 1924

Himalayan and Peninsular Varieties of Indian Species of Anopheles. S. R. Christophers.—p. 11.
Culicine Mosquitoes of India. XIV. Indian Species of Subgenus Culiciomyia (Theo.) Edw., Including One New Species. P. J. Barraud.—p. 15.
Indian Anophelines of Funestus Group and Description of New Species (Diptera, Culicide). M. O. T. Iyengar.—p. 23.
Nature of Blastocystis Hominis. R. Knowles and B. M. Das Gupta.—p. 31.
Culicine Mosquitoes of India. Part XV. Indian Species of Subgenus Lophoceratomyia (Theo.) Edw., Including Two New Species. P. J. Barraud.—p. 39.
*Incidence of Albuminuria in Malaria: Occurrence During Quinin and Alkali Treatment. J. A. Sinton and R. B. Lal.—p. 47.
Value of Chemical Analysis of Drinking Waters. R. S. V. Govinda Raju.—p. 65.
Recent Methods of Differentiating Lactose Fermenting Organisms, as Applied to Indian Conditions. J. Cunningham and T. N. S. Raghavachari.—p. 75.
*Latent Dysentery. J. Cunningham, J. H. Theodore and K. V. Krishnan.—p. 83.
Transmission of Dracunculus Medinensis. II. N. H. Fairley and W. G. Liston.—p. 93.
Cases of Pneumonia Treated with Pneumococcus Vaccine. R. H. Malone.—p. 105.
Analysis of Malone's Report on Treatment of Pneumonia by Vaccine. H. H. King.—p. 109.
Chemotherapy of Antimonial Compounds in Kala-Azar Infection. X. Influence of Basic Radical and Repeated Injections of Antimonyl Tartrate on Excretion of Antimony. U. N. Brahmachari and P. B. Sen.—p. 113.
*Complement Fixation in Leprosy with Defatted Bacillus Tuberculosis Antigen. J. Taylor and R. H. Malone.—p. 127.
Culicine Mosquitoes of India. XVI. Indian Species of Theobaldia Neveu-Lemaire. P. J. Barraud.—p. 139.
Anophelines Funestus, Minimus and Aconitus, Including Description of Larva of Minimus. C. Strickland.—p. 145.

Concentration of Anticobra Serum. III. Separation of Proteins. J. F. Caius, K. R. K. Iyengar and L. A. P. Anderson.—p. 153.
Simple Method of Preparing Series of Tenth Dilutions. S. N. Gord. —p. 157.
Method for Classification of Aerobic Bacilli Growing Well on Ordinary Laboratory Mediums. Key for Provisional Identification of Certain Aerobic Nonspore Producing Intestinal Bacilli and Vibrios. S. N. Gord.—p. 161.
Hymenolepis Nana Infection in India. S. H. Nanavutty.—p. 179.
Malaria in Punjab. Epidemic Forecast for 1923. C. A. Gill.—p. 185.
Tubercle Bacilli Subjected to Autolysis; Antigenic Value of Their Lipoid Products. R. Row.—p. 195.
Experiments on Toxicity and Immunizing Value of Haffkine's Anti-Plague Vaccine. W. D. H. Stevenson and R. J. Kapadia.—p. 199.
*Effect of Antisyphilitic Treatment on Wassermann Reaction in Leprosy. R. B. Lloyd, E. Muir and R. G. C. Mitra.—p. 213.

Incidence of Albuminuria in Malaria.—Of fifty-seven cases of benign tertian malaria examined by Sinton and Lal, seven had albuminuria; of 410 cases of malignant tertian malaria, fifty-seven had albuminuria. The possible toxic action of quinin and alkali on the kidneys was investigated but more was discovered; in fact the results show some slight diminution in the severity of the albuminuria in the cases treated with alkali.

Latent Dysentery.—Analysis of the results of three separate investigations has convinced Cunningham, Theodore and Krishnan that a latent form of dysentery exists, cases of which may, when examined, show the presence of mucus or blood and mucus in the stools and may also be secreting dysentery bacilli. Such cases are compatible with apparent health and are therefore likely to pass unnoticed. Cases of diarrhea, unless proved to be due to another cause, should be included as cases of latent dysentery. The macroscopic examination of the stools of the whole population is the easiest and most practical method of detecting these cases. A series of twelve macroscopic examinations is sufficient to detect all but a negligible quantity of the cases of latent dysentery present in any population. The proportion of latent dysentery can be expressed as a "dysenteric index," similar to the spleen rate in malaria, and can be used as an expression of the prevalence of dysentery in any community.

Complement Fixation Test for Leprosy.—A complement fixation test for leprosy with a "defatted" *B. tuberculosis* antigen is described by Taylor and Malone and the results in 100 cases of leprosy, along with suitable controls, are recorded. The antigen is a saline suspension of *B. tuberculosis* "defatted" in accordance with Dreyer's procedure and standardized by opacity. In 100 cases of leprosy tested—tubercular, nerve and mixed cases have given positive results in 100 per cent., 96 per cent. and 92 per cent. in these three classes, respectively. The standard of a positive result has been taken as complete fixation of at least 2 M. H. D. of complement and in many cases fixation up to six doses was obtained. Fourteen normal controls and twenty-three Wassermann-positive syphilitic controls have given completely negative results with the test. With serum from thirty cases of tuberculosis positive results have been obtained in 20 per cent. only, but as partial reactions are accepted the percentage will be increased to 40.

Effect of Antisyphilitic Treatment on Wassermann Reaction.—Lloyd et al. concluded that syphilis is an important complicating factor in both types of leprosy, and that antisyphilitic treatment should accordingly be given in all cases of primary nerve leprosy with a positive Wassermann reaction, and in skin cases with a positive Wassermann reaction when a venereal history is obtained or when the case is refractory to other treatment.

International Journal of Psycho-Analysis, London

5: 271-418 (July) 1924

Active Therapy and Psycho-Analysis. E. Glover.—p. 270.
Rôle of School in Libidinal Development of Child. M. Klein.—p. 312.
Heightened Instinctual Life and Obsessional Neurosis in Child. E. Hitschmann.—p. 332.
Psychology of Child Sexuality. V. Tausk.—p. 343.

5: 419-514 (Oct.) 1924

Passing of Oedipus Complex. S. Freud.—p. 419.
Telepathy and Psycho-Analysis. E. Hitschmann.—p. 425.
Psycho-Analysis of Unconscious Sense of Guilt. T. Reik.—p. 439.
Genesis and Dynamics of Inventor's Delusion. A. Kielholz.—p. 451.
Letters of Alphabet in Psycho-Analytic Formations. K. A. Menninger. —p. 462.

Journal of Tropical Medicine and Hygiene, London

27: 283-298 (Nov. 1) 1924

Source of Bilharzia Infection and Combined Treatment of Case in Natal. F. G. Cawston.—p. 283.
Tinea Labialis (Betel-Nut Dermatitis of Lips). W. R. Mendelson. —p. 284.
Yellow Fever Prophylaxis. A. Agramonte.—p. 285.
Persistent Case of Oriental Sore of Face, Successfully Treated by Phosphorated Oil. H. Van G. Kelaart.—p. 288.

South African Medical Record, Cape Town

22: 483-496 (Oct. 25) 1924

Modern Conceptions in Regard to Diet of Healthy Infancy and Childhood. E. P. Raumann.—p. 465.
*Management of Vulvovaginitis in Children. A. R. Fraser.—p. 467.
Schistosomiasis in Natal. C. G. K. Sharp.—p. 471.
*Oil of Chenopodium as an Anthelmintic. G. W. Doran.—p. 474.
Case of Roentgen-Ray Burn. G. J. C. Smyth.—p. 476.
*Successful Epiploplexy for Biliary Cirrhosis. K. Bremer.—p. 477.
*Case of Probable Human Infection with Bacillus of Epizootic Abortion. W. E. de Korte.—p. 478.

Treatment of Vulvovaginitis in Children.—Fraser advises that the rectum be irrigated four-hourly with hot potassium permanganate 1:12,000, or silver nitrate 1:20,000. The vagina is irrigated with surgical solution of chlorinated soda night and morning. Potassium permanganate solution, 1:16,000, with the addition of 0.5 per cent. sodium carbonate, is the only suitable alternative. Both these solutions have been found superior to chloramine T and acriflavine. The child receives a hot sitz bath four-hourly until the acute stage is over. Thereafter the number of sitz baths may be reduced. Once or twice weekly the vagina is swabbed dry by means of mops applied via a urethroscope tube or tiny speculum. Success depends entirely on the thoroughness of this swabbing, and no part of the mucosal surface should escape. This is followed by swabbing with tincture of iodin in glycerin, in a strength of 1:8, and the urethral orifice is similarly treated. The strength is increased gradually until the iodin and glycerin are used in equal parts. A pledget of wool, saturated in the solution, is left in position between the labia for an hour or more. The iodin in glycerin may be replaced by picric acid in glycerin, 1 per cent., or mercurochrome-220 soluble, 20 per cent.

Oil of Chenopodium as Anthelmintic.—In employing oleum chenopodii as an anthelmintic, Doran states that the following technic gives the best result: Allow the patient a light meal, such as rice or bread and milk, twelve hours before the drug is to be administered. Divide the dose to be given into two equal portions to be taken at an interval of one hour. From one to two hours later give a large saline purgative. Repeat after a few days if any signs of parasites are still present. Always commence with a small dose, making due allowance for age, sex and general condition of patient. Do not give any other vermifuge in conjunction with chenopodium. Always examine the heart and the urine before prescribing. The best cathartic is a saline purge administered with the proper precautions. No unpleasant after-effects are felt. It destroys several different types of intestinal parasite, and, last of all, it gives at least as high a percentage of cures as any other remedy.

Epiploplexy for Biliary Cirrhosis.—Bremer's patient was 16 years of age. She was suffering from ascites. There was no evidence of syphilis or tuberculosis. Bremer performed a Talma-Drummond epiploplexy, and found the liver large and dark red, with a somewhat roughened surface. All the fluid was evacuated and the liver surface further roughened with gauze to assist adhesions. The omentum was then sewed into the peritoneal wound in the usual way. The liver is still large, but no fluid is present.

Human Infection with Bacillus of Epizootic Abortion.—De Korte reports the case of a man who became infected when he manually removed the afterbirth from a cow that had aborted. On testing the patient's serum with the *B. abortus* of Bang, definite agglutination was found in dilutions as high as 1:400. *B. abortus* vaccine at first reproduced and exacerbated all the symptoms of the disorder, but seemed to be a great factor in restoring the patient to health.

Bulletin de l'Académie de Médecine, Paris

92: 1067-2000 (Nov. 4) 1924

Prophylaxis of Tuberculosis in Health Resort. Lalesque.—p. 1073.
Hygienic Measures Needed in Northern Africa. Dinguizli.—p. 1086.
Anatomy of Tubal Pregnancy. Auvray.—p. 1092.
*Treatment of Old Deformity of Hand. H. Rouvillois.—p. 1094.
*Hemostatic Effect of Pectin. Violle and de Saint-Rat.—p. 1097.

Treatment of Traumatic Deformity of Hand.—Rouvillois succeeded in restoring function in a case of crippling deformity, resembling clubhand, of more than eight years' standing. The hand was twisted outward almost at a right angle. He straightened the hand by resecting 3.5 cm. of the upper third of the ulna, with metal plate fixation. The defect in the radius was in the lower end.

Hemostatic Action of Pectin.—Violle and Saint-Rat state that pectin exerts a hemostatic action, with a maximal effect in one or two hours after ingestion, and the effect persists for eight or twelve hours, gradually declining. The solutions are rapidly assimilated and eliminated. They do not produce colloidal shock or anaphylaxis, and no changes in the blood or arterial tension were noted. The coagulation time is accelerated in a proportion of from 25 to 33 per cent. Ingestion of 40-60 c.c. of a 1 or 2 per cent. solution of pectin arrested hemorrhage in many cases. Experiments on animals encourage trials of subcutaneous and intravenous injections of pectin in man. It is possible that certain deficiency hemorrhagic conditions, caused by lack of vegetables, may be explained by absence of the gelatinizing action of pectin.

Bulletins de la Société Médicale des Hôpitaux, Paris

48: 1487-1516 (Nov. 7) 1924

Arsphenamin in Blood Transfusion. Flandin and Tzanck.—p. 1487.
Value of Anatoxin Reaction in Epidemics. C. Zoeller.—p. 1489.
Electrocardiograms in Cardiac Insufficiency. Arrillaga.—p. 1493.
Encephalitis Symptoms in Influenza. H. Eschbach.—p. 1498.
*Emetin in Abscess of Lung. M. Brulé and P. Hillemand.—p. 1500.
Spirochetal Jaundice After River Bathing. G. Railliet.—p. 1502.
Desiccated Milk in Infant Feeding. G. Variot and Nanzie.—p. 1508.
Curability of Hemiplegia from Syphilitic Arteritis. C. Foix and P. Hillemand.—p. 1511.
*Inverse Deviation of Head and Eyes. C. Foix and P. Hillemand.—p. 1512.

Emetin in Treatment of Abscess of Lung.—Brulé and Hillemand emphasize that in cases of abscess of the lung, when the nature of the lesion is not clear, emetin should be administered without delay. Patients with a latent amebiasis may be cured, and a futile artificial pneumothorax or operation will be prevented.

Inverse Deviation of Head and Eyes in Hemiplegia.—Foix and Hillemand observed three cases of hemiplegia in which, owing to contracture, the head was turned to the paralyzed side, but the eyes turned to the side of the lesion. Necropsy showed cerebral hemorrhage or softening of the brain involving the semioval center and optic radiations. They explain the inverse deviation by occurrence of hemianopsia, and the effort to turn the eyes to the visible field.

Comptes Rendus de la Société de Biologie, Paris

91: 991-1058 (Nov. 14) 1924

*Obligate Anaerobic Streptococcus. A. R. Prévot.—p. 993.
Tissue Extracts that Check Coagulation. M. Doyon and J. Vial.—p. 1000.
*Excretion of Phosphorus by Microbes. E. Pozerski.—p. 1004.
Cultivation of Spirochete of Infectious Jaundice from Water of Swimming Pool. E. Etchegoin.—p. 1005.
Share of the Skin in the Resistance to Electric Current. Strohl et al.—p. 1007.
*"Photochemical Resonance." E. Rousseau.—p. 1009.
*Epinephrin in Insulin Hypoglycemia. B. A. Houssay et al.—p. 1011.
*Colorimetry of Lecithin in Blood. A. Grigaut.—p. 1014.
*Experimental Malformations in Eggs. H. Cardot.—p. 1019.
*Metabolism in Cancer. M. Labbé and Mouzaffer.—p. 1029.
*Susceptibility to Insulin. B. A. Houssay and R. R. Busso.—p. 1037.
*Latent Persistence of Plague Bacilli. L. Uriarte.—p. 1039.
Potassium Chlorid Enhances Action of Quinidin. Waldorp.—p. 1044.
*Reflex Secretion of Epinephin. B. A. Houssay and F. A. Molinelli.—p. 1045. Idem, p. 1056.
Influence of Manganese on Immunity Phenomena. C. Pico.—p. 1049.
Purification of Cowpox Vaccine. Carbonell et al.—p. 1054.

Obligate Anaerobic Streptococcus.—Prévot claims to have discovered in pulmonary gangrene a species of streptococcus from 0.6 to 0.7 microns in diameter, which is strictly anaerobic, and does not generate gas or a fetid odor on any medium. It produces acid in glucose mediums, curdles milk in twenty-four hours and the whey does not separate. Prévot calls the bacterium *Streptococcus intermedius* on account of its analogy with anaerobic species and, on the other hand, with *Streptococcus pyogenes.*

Excretion of Phosphorus Compounds by Microbes.—Research on different species showed, Pozersky says, that microbes possess the property to excrete compounds of phosphorus, as long as they are alive.

Photochemical Resonance.—Rousseau has coined this term to express the fixation of the ultraviolet energy by certain substances.

Secretion of Epinephrin in Hypoglycemia from Insulin.—Houssay, Lewis and Molinelli conclude from their experiments on dogs that during hypoglycemia, following insulin administration, the suprarenal capsules elaborate a substance, probably epinephrin, which increases the output of sugar. The phenomenon is due to the action of the splanchnic nerves, and is connected with the hypoglycemia. Augmented production of epinephrin is manifest also in morphin poisoning.

Colorimetric Measurement of Lecithin in the Blood.—Grigaut describes a colorimetric method with a probable error of less than 3 per cent. With this method the content of lecithin proved to be from 0.17 per cent. to 0.19 per cent. in human serum, and 0.25 per cent. in the erythrocytes.

Experimental Malformations in Eggs of Land Snails.—Cardot observed anomalies in the eggs and in the embryos of all slugs in captivity. Different conditions which affected the nutrition of the animal (deficient alimentation, high temperatures, intoxications), increased the frequency of the malformations, as also experimental changes in external conditions.

Deranged Metabolism in Cancer.—Labbé and Mouzaffer's study in thirty-one cases of cancer indicated that the excretion of amino-acids and of colloidal nitrogen is normal in cancer situated elsewhere than in the digestive tract, and is only exceptionally increased with cancer of this tract, but is considerably exaggerated in cancer of the liver. The disturbance in nitrogen metabolism does not seem to be caused by the general malnutrition, or the rapid destruction of cancer cells, but by functional changes in the liver. This may be due to a secondary cancer in the liver, or to the effect on the liver of cancer in the digestive tract. The occurrence of amino-aciduria is a sign of liver insufficiency.

Sensitivity to Insulin in Thyroidectomized Animals.—Removal of the thyroid gland notably increased the susceptibility to the toxic effect of insulin in rabbits and rats, but less in guinea-pigs, still less in dogs. The reduction of the glycemia was greater in the thyroidectomized animals.

Latent Persistence of Plague Bacillus in Infected Organism.—Uriarte refers to an observed case of bubonic plague with iridocyclitis and hypopyon in one eye. In spite of clinical recovery, the patient died three weeks later with meningeal symptoms. Necropsy revealed the presence of the plague bacillus which had been found in the meningeal lesions and also in the hypopyon. Inoculation of these bacilli killed a guinea-pig. The latent persistence of the bacilli was confirmed by their presence in the spleen of inoculated guinea-pigs thirty-four days after the infection, and twenty-five days after apparent complete recovery from the original infection.

Secretion of Epinephrin on Irritation of Medulla Oblongata.—Houssay and Molinelli's research on 100 dogs proved the participation of epinephrin in the hyperglycemia following puncture or electric irritation of the medulla oblongata.

Reflex Secretion of Epinephrin.—By an intensive irritation of the vagus in dogs, Houssay and Molinelli obtained an increase of epinephrin secretion, while a moderate irritation reduced the secretion.

Presse Médicale, Paris

32: 881-892 (Nov. 8) 1924

Generalized Infections in Relation to Surgical Affections. E. Libman (New York).—p. 881.
*Bile Peritonitis. J. Meyer-May.—p. 883.
Tryparsamide in Neurosyphilis. L. Cheinisse.—p. 886.

Bile Peritonitis Without Evidence of Perforation.—Meyer-May concludes from a personal case that bile peritonitis is always due to perforation of the gallbladder, although the

lesion may escape detection. A porous condition of the gallbladder, and hypertension of the bile are the causal factors. Any infection of the gallbladder with occlusion of the common bile duct may entail the bile peritonitis. Early surgical intervention, cholecystectomy or drainage of the biliary tract is indispensable.

82: 901-912 (Nov. 15) 1924
*Experimental Intestinal Obstruction. G. H. Roger.—p. 901.
*Prehension Reflex. A. Ianichewski.—p. 905.
Different Diets in Treatment of Gastric Ulcer. L. Cheinisse.—p. 906.

The Duodenum in Experimental Intestinal Obstruction.—Roger's experiments showed that the toxic syndrome from the obstruction is caused mainly by poisons from the duodenum. Some of the poisons are due to the action of digestive juices, especially the pancreatic juice. Others originate within the intestinal wall, and pass partly into the digestive tract, partly into the lymph and blood circulation. A further factor in this abnormal functioning is the suppression of peristaltic movements in the duodenum, which aids in the intestinal obstruction. Auto-intoxication of duodenal origin occurs also with obstruction of the portal vein, suprarenal insufficiency, and experimental aseptic peritonitis from intraperitoneal injections. The explanation is that all these morbid conditions check duodenal peristalsis.

The Prehension Reflex in Epidemic Encephalitis.—Ianichewski noted the grasping reflex in hundreds of cases of lethargic encephalitis under his observation. The clinical course, as well as the necropsy, indicated that the phenomenon is caused by an extrapyramidal lesion. It is due to inhibition of the action of the cerebral cortex on the midbrain. The reflex has a diagnostic value, as it is manifest even in slight forms of lethargic encephalitis in which parkinsonian symptoms are not pronounced.

82: 913-924 (Nov. 19) 1924
Reasons for Operating in Chronic Appendicitis. Faure.—p. 913.
*The Dismemberment of Dementia Praecox. A. Cellier.—p. 913.
The Abuses of Osteosynthesis. G. Blanchard.—p. 916.
Influence of Light on Nutrition and Growth. L. Binet.—p. 918.

Differentiation of Dementia Praecox.—Cellier believes that the term dementia praecox should be applied only to the Morel type—hebephrenia-catatonia in adolescents, with a trend to rapid dementia. Without this rapid mental impairment, there is no true dementia praecox. The pathologic anatomy of dementia praecox and of hebephrenia-catatonia is much alike. He emphasizes that systematized delirium and the incoherent delirium of degenerates, chronic mental confusion, delirium and schizophrenia should not be classed with dementia praecox.

Revue de Chirurgie, Paris

68: 579-662, 1924
*Axone Reflexes in Peripheral Traumatism. R. Leriche.—p. 579.
Dissecting Gangrenous Cystitis. Costantini et al.—p. 590.
Surgical Treatment of Dermoid Cysts in the Mediastinum. L. Auroussseau.—p. 635. Conc'n.

Reflex Disturbances in Peripheral Traumatism.—Leriche reviews the recent work of Albert which confirmed the absolutely constant occurrence with peripheral trauma of immediate vasomotor reactions, constriction of the vessels at first, the frequent disproportion between the significance of the traumatism and the severity of the vasomotor reactions, and the irregularity in the development of reflex disturbances in the nerves of the region. The disturbances are due to what may be designated as axone reflexes of traumatic origin. Leriche emphasizes the early appearance of these disorders. Two or three weeks after an apparently insignificant injury to a finger, for example, stiffness of the fingers and atrophy of the arm and shoulder muscles may develop. Axone reflexes are not limited to traumatism of the extremities. He describes a case of fracture of the humerus followed by a grave condition of this kind. Periarterial sympathectomy high on the brachial artery resulted in rapid improvement, followed by constant but slow gain. After the minor accidents of workingmen, amputation is generally made close to the lesion, which is wrong, as stiff cicatricial tissue may compress nerves and blood vessels and hamper function. Correct surgical operations leave supple cicatricial tissue. With fractures in which reduction is difficult, Leriche prefers operative correction. In continued vasomotor disturbances with secondary manifestations the possible anatomic cause must be removed. If the condition persists, arterial decortication may prove efficacious in cases of poor local nutrition, painful phenomena, acrocyanosis and edema. With atrophy, hypertension or hypotension, this alone does not suffice. Leriche questions the value of massage, but recommends hydrotherapy. He has used hot baths, but is inclined to try water at 5 C. for two or three minutes. His methods achieve a slow functional restoration with more or less complete return to normal after several months. He remarks that periarterial sympathectomy, to be effectual in these cases, must have an action directly contrary to the abnormal vasomotor action of the axis-cylinder reflex.

Revue de Médecine, Paris

41: 281-344, 1924
Congested Veins Sign of Hyperemia in Lung Below. C. Truneceh.—p. 281.
Indications for Duodenal Intubation. E. Libert.—p. 297.
Prophylaxis in Contagious Intestinal Diseases. H. Godlewski.—p. 326.
Pathology of the Mediastinum. Idem.—p. 332.

41: 345-391, 1924
Intestinal Infections and the Colon Bacillus. A. Besson and G. Ehringer.—p. 345. Conc'n.—p. 419.
*Sunlight, Spasmophilia and Rickets. P. Woringer.—p. 356.
Sandfly Fever and Dengue in Syria. Trabaud.—p. 379.
Present Status of Treatment of Gout. H. Godlewski.—p. 389.

Relation of Sunlight to Spasmophilia and Rickets.—Woringer reiterates the importance of the preventive and definitely curative action of sunlight and ultraviolet rays in spasmophilia and rickets. With special reference to periodic occurrence and geographic distribution, he explains that the absence of sunlight is the primary cause of spasmophilia and rachitis, diet being a secondary factor. He also points to the influence of light treatment on certain accompanying infections. From the remarkable effect of sunlight, the fundamental principle follows that infants should regularly be exposed to it. In densely populated districts and in countries with long, dark winters, the realization of this is difficult. The mercury vapor quartz lamp affords the most practical solution. He affirms that a five minute exposure daily to a 3,000 candle power lamp will suffice for the cure of spasmophilia and rickets, and believes that two or at the most three treatments weekly would suffice for their prevention. Hence all child welfare centers should be equipped with the quartz lamp, for regular use on all children brought in, particularly from the ages of 3 to 18 months. This would gradually effect the complete disappearance of spasmophilia and rickets. For the health of infants, sunlight and good milk are of equal importance.

41: 393-456, 1924
Acute Intoxication from Barbituric Acid Derivatives. A. Tardieu.—p. 393.

41: 457-520, 1924
Intravenous Injections of Ouabain. A. Dumas.—p. 457.
Chemical Research on Effusions. Z. Gorecki.—p. 470.
*Ultraviolet and Infra-Red Rays in Therapeutics. L. Oppenheim.—p. 485.
Bismuth Treatment in Syphilis. A. Pulawski.—p. 513.

Ultraviolet and Infra-Red Rays in Therapeutics.—Oppenheim reviews the history of heliotherapy and actinotherapy. Two points appear definite: that the skin is an organ of internal secretion, affected by light, and that pigmentation is important in the utilization of light rays by the body. Autopigmentation is a reaction of self-protection against infections to which various parts of the body are exposed. The relation between pigmentation and the nutritive and functional activity of the skin is illustrated by grafting black and white skin. Oppenheim recommends the mercury quartz lamp because of the percentage of ultraviolet rays, the total absence of infra-red rays, and its practicability at all times and places, to the advantage of both children and adults. He reports a large number of cases of surgical tuberculosis cured by three two-hour exposures weekly. While infra-red rays may be used preparatory to ultraviolet radiations, reversal of the order is out of the question, as the infra-red rays counteract the ultraviolet; hence their efficacy in treatment of radiodermatitis. In his experience since 1910, actinotherapy in surgical tuberculosis and in pulmonary tuberculosis

in its early stages greatly surpassed all earlier methods of treatment in efficacy. The ultraviolet rays—the "life rays"—are winning their deserved place in therapeutics.

Schweizerische medizinische Wochenschrift, Basel

54: 1025-1048 (Nov. 6) 1924

*Etiology of Glaucoma. J. Stähli.—p. 1025.
The Phenolsulphonephthalein Test in Surgery. E. Jaeger.—p. 1032.
*Essential Acetonuria. W. Jadassohn.—p. 1034.
*Calcification of Cartilages and Arteries. Huyssen.—p. 1037. Conc'n.

Etiology of Glaucoma.—Stähli reviews extensively and critically the theories in regard to the origin of glaucoma. He hopes that the solution will come from research on colloids, although he is convinced that Fischer's theory is untenable in its original formulation.

Essential Acetonuria.—Jadassohn reports the history of five young women with symptoms resembling appendicitis and considerable amounts of acetone in the urine. All of them recovered spontaneously—one in spite of the operation which revealed a normal appendix. Chloroform is contraindicated in such patients. The affection corresponds to the acetonemic vomiting of childen. He also reports two cases of appendicitis with acetonuria.

Calcification of Cartilages and Arteries.—Huyssen concludes from his necropsy findings that calcification of costal cartilages (with the exception of the first) warrants assumption of arteriosclerosis. Affections of the coronary arteries occurred with an especially marked calcification of these cartilages.

Archivio Italiano di Chirurgia, Bologna

10: 253-432 (Oct.) 1924

*Access to the Pituitary. P. L. Della Torre.—p. 253.
Reconstruction of Abdominal Wall. G. Razzaboni.—p. 277.
Experimental Study of Tardy Suture of Kidney. Boscoroni.—p. 297.
*Etiology of Peptic Ulcer. G. Baggio.—p. 339.
Present Status of the Question of Surgical Treatment of Exophthalmic Goiter. G. Carossini.—p. 355.

Access to the Pituitary.—Della Torre gives an illustrated description of a modification of Chiari's transorbital ethmoidal technic.

Etiology of Peptic Ulcer.—Baggio relates that peptic ulcers developed in 27 per cent. of eleven dogs treated by gastro-enterostomy and shutting off the pylorus. There were no peptic ulcers in other groups in which the gastro-enterostomy was not accompanied by closing the communication between the pylorus and the duodenum, or else the pylorus region was resected. The amount of the gastric juice, and a direct action on the jejunum by the gastric juice secreted by the pyloric portion of the stomach, seem to be the main factors in postoperative peptic ulcers.

Policlinico, Rome

31: 1391-1425 (Oct. 27) 1924

Insulin Treatment of Diabetes. A. Sebastiani.—p. 1391.
Calculus in Ureter. L. Marziani.—p. 1403.
Staining Blood Slides. G. Petta.—p. 1405.

31: 1427-1458 (Nov. 3) 1924

*Bismuth Determination. P. Amodei.—p. 1427.
*Chickenpox Meningitis. G. de Toni.—p. 1434.

Bismuth Determination.—Amodei considers Aubry's method for determination of bismuth in organic fluids as the best. He has modified the technic to avoid some causes of error.

Chickenpox Meningitis.—Toni observed a serous meningitis with xanthochromia, lymphocytosis (78 cells per c.mm.) and increased globulin content of the cerebrospinal fluid. The affection occurred twenty days after a chickenpox eruption, and the child, aged 3, recovered.

31: 1459-1489 (Nov. 10) 1924

*Antihemolytic Urine Index in Pregnancy. A. Ricart.—p. 1459.
Treatment of Arthritis. L. Conti.—p. 1464.
Treatment of Tuberculous Glands. R. Lambri.—p. 1465.
Polyneuritis After Peritonsillar Abscess. A. Venuti.—p. 1466.

Antihemolytic Urine Index in Pregnancy.—Ricart concludes that a urinary antihemolytic index cannot give any valuable prognostic hints in pregnancy and the puerperium.

Riforma Medica, Naples

40: 1033-1056 (Nov. 3) 1924

Otitic Meningitis. G. Gradenigo.—p. 1033.
Intracardiac Injection. G. Nicolich and G. Putotechnig.—p. 1034.
*Emetin Enemas in Amebic Hepatitis. C. Pappalardo.—p. 1036.
Antipituitary Precipitins. C. L. Laura.—p. 1039.

Emetin Enemas in Amebic Hepatitis.—Pappalardo reports recovery of a patient with amebic liver abscess treated with emetin enemas. About four hours after a cleansing enema with pure water, he injected 0.03-0.05 gm. of emetin in 100 c.c. of a mucilaginous solution, with addition of 20-30 drops of tincture of opium.

Deutsche medizinische Wochenschrift, Berlin

50: 1529-1568 (Nov. 7) 1924

Treatment of Hypertrophy of the Prostate. L. Casper.—p. 1530.
*Treatment of Epilepsy. P. Karger.—p. 1531.
*Constitution and Serology. P. Mino.—p. 1533.
Flocculation and Wassermann Reactions. H. Martin.—p. 1536.
The Möllöy Reaction and Sedimentation Test in Tuberculosis. A. Beckmann.—p. 1537.
The Mineral Water of Wildbad. P. Schober.—p. 1542.
*Metabolism in Pernicious Anemia. Weicksel.—p. 1543.
*Purulent Perimeningitis. E. Schwab.—p. 1544.
Prevention of Measles with Normal Serum. S. Wolff.—p. 1545.
Mercury Lamp Treatment of Whooping Cough. F. Rohr.—p. 1545.
Survey on Pathology. Teutschländer.—p. 1546.
Reform of Social Insurance. Kaufmann.—p. 1547.
Models of Contracts with Publishers. J. Schwalbe.—p. 1548.
Dangers Confronting Medicine as a Free Profession. S. Alexander.—p. 1550.
Pluriglandular Origin of Diabetes. E. J. Kraus.—p. 1559.

Treatment of Epilepsy.—Karger confirms the results of Stargardter's treatment of epileptic children with stimulants (caffein). The method is indicated if the seizures are in relation to sleep or fatigue. He gave from once to three times daily 10-15 drops of a 20 per cent. solution of caffein sodiobenzoate. The treatment has to be continued for two or three months and then the dose may be gradually reduced. He also had good results with alimentary acidosis (protein and fat diet).

Constitutional Differences from the Serologic Standpoint.—Mino prefers his theory of a panhemo-agglutinin to Hirschfeld's hypothesis of a constitutional thermic amplitude. He explains the facts supporting the theory of more than four blood groups by pointing out that not the iso-agglutinins, but only the ability to produce them is inherited. A stimulation treatment increases their titer in subjects who might be erroneously classed as new groups.

Metabolism in Pernicious Anemia.—Weicksel observed an increased elimination of nitrogen and uric acid in pernicious anemia patients after blood transfusions. The increase lasted for four days. The first transfusion of 400-600 c.c. of blood was usually followed by a remission lasting for six to nine months. Remissions following the second transfusion were neither as pronounced nor as long as after the first. The third was without success as a rule.

Purulent Perimeningitis.—Schwab's patient, a boy, 16 years of age, had furunculosis. Four weeks later high fever and pains in the kidney region developed. Two days later, the legs and bladder were paralyzed and the lower dorsal and upper lumbar vertebrae were quite tender. No rigidity of neck. Lumbar puncture revealed pus containing staphylococci. The diagnosis of purulent perimeningitis (Morawitz) was made, but the operation was performed apparently too late. Although the paralysis improved immediately, the patient succumbed the next day.

Klinische Wochenschrift, Berlin

3: 2033-2080 (Nov. 4) 1924

Regulation of the Circulation of the Blood. Mobitz.—p. 2033.
*Periarterial Sympathectomy. H. Friedrich.—p. 2035.
Fractioned Aspiration from the Stomach. W. Weitz.—p. 2040.
*Calcium and Coagulation of the Blood. W. Loewenstein and G. Politzer.—p. 2042.
*Action of Bulbocapnin. H. de Jong and Schaltenbrand.—p. 2045.
*Menstruation and Cerebrospinal Fluid. Heilig and Hoff.—p. 2049.
"Death After Intravenous Injection of Bismuth." Kallmann.—p. 2055.
*"Pneumococcus Meningitis." H. Mühsam.—p. 2055.
*The Mind and Serum Calcium. H. Tomasczo.—p. 2055.
*Quinin-Resistant Lipase in the Serum. Meyer and Jahr.—p. 2056.
*Heart Spasm and Atony. Arnoldi and Kindermann.—p. 2056.
Hemolysis by Oligodynamic Action. D. Rosenberg.—p. 2057.

Exacerbation of Epidemic Encephalitis After Exertion. Beringer.—p. 2058.
Blood Transfusion. P. Schumacher.—p. 2058.
Experimental Research on Syphilis. Bauchke and Gumpert.—p. 2061.

Periarterial Sympathectomy.—Friedrich observed an extreme contraction of the brachial artery before the adventitia was removed; it is due to direct irritation. The most constant therapeutic result of periarterial sympathectomy is the disappearance of pains. A dog reacts violently, even in general anesthesia and after section of the peripheral nerves, to intra-arterial injection of 50 per cent. lactic acid. Ligation of the artery prevents the pain. The hyperemia following periarterial sympathectomy is active, and is sometimes connected with an increase in blood pressure in the extremity (up to 40 mm. mercury). Yet the curative action is not due exclusively to hyperemia. He observed healing of a torpid ulcer in a case in which postoperative suppuration and hemorrhage had made high ligation of the femoral artery and vein imperative. He concludes that, aside from the hyperemia, some unknown factor—perhaps a change in the trophic innervation—cooperates to account for the results.

Calcium and Coagulation of the Blood.—Loewenstein and Politzer found no shortening of the clotting time in ten patients after ingestion of 12 gm. of calcium lactate within three days. Intravenous injections of calcium chlorid were followed by increased speed of coagulation, which lasted for twenty-four hours, especially in patients with low blood calcium concentration.

Action of Bulbocapnin.—De Jong and Schaltenbrand injected up to 0.2 gm. of bulbocapnin chlorid (one of the eleven alkaloids isolated from the larkspur) in patients with Parkinson's disease and in cerebellar and other types of tremor. All of them were transiently benefited.

Menstruation and the Cerebrospinal Fluid.—Heilig and Hoff used Kafka's sodium fluorescein method for determination of the permeability of the meninges. They found on the first day of menstruation almost ten times as much of the dye in the cerebrospinal fluid as during the intervals. Simultaneous injection of thyroid and corpus luteum extracts in female dogs caused likewise an increased permeability. The sugar concentration and the refraction of the cerebrospinal fluid of menstruating women are higher, and the chlorid content lower than at other times.

"Pneumococcus Meningitis."—Mühsam observed recovery after acute meningitis of various etiology—including pneumococci—after simple repeated lumbar puncture, thus relieving the pressure. He believes that his results are much better than when the specific antiserums or ethylhydrocuprein are used.

The Blood and Serum Calcium.—Tomasson determined the serum calcium in 200 inmates of an insane asylum; 80 per cent. of them gave abnormal figures. The abnormalities were found most frequently in those with manic-depressive insanity.

Quinin-Resistant Lipase in the Serum.—Meyer and Jahr made 300 tests for quinin-resistant lipase in the serum of 200 patients, ninety of whom had liver disease. The reaction was negative in the controls, and in five patients with hemolytic jaundice. It was positive in patients with affections of the liver, in the progressive phases of the disease.

Heart Spasm and Ataxy in Man.—Arnoldi and Kindermann obtained phlebograms indicating spastic contractions of the heart by feeding patients with phosphates, or having them drink large quantities of water, or by injecting calcium chlorid. Hypotonic curves resulted after 90 gm. of sodium bicarbonate had been given within three days.

Medizinische Klinik, Berlin

20: 1559-1598 (Nov. 9) 1924

*Irritability During Sleep. A. Peiper.—p. 1559.
Easy Methods of Blood Examination. C. S. Engel.—p. 1560.
Gaucher's Splenomegaly. L. Pick.—p. 1561. Cont'n.
*Occult Spina Bifida. W. Altschul.—p. 1567.
*Wassermann's Tuberculosis Reaction. Kretschmer and Bodenheimer.—p. 1568.
Fibromas Near Finger Joints. G. Hauch.—p. 1569.
*Decompressive Laminectomy. G. Wolfsohn.—p. 1569.
Intrathoracic Auscultation. S. Bondi.—p. 1570.
*Prevention of Congenital Syphilis. E. Levin.—p. 1570.
Dermatoses During Bismuth Treatment. K. Bona.—p. 1571. Conc'n.
Idiosyncrasies. L. Adelsberger.—p. 1573.
Gastrotomy for Pin in Stomach. K. Fritzler.—p. 1575.
"Barium Preparations." Bauermeister.—p. 1576. Reply. Withowsky.—p. 1577.
*Inclusions in Leukocytes in Grave Jaundice. K. Blum.—p. 1577.
*Antipepsin of Blood Serum. O. Einstein.—p. 1578.
Treatment of Chronic Arthritis. Isaac-Krieger and Nash.—p. 1579.
Hysterical Reactions. E. Romberg.—p. 1581.
Obstetric Breviary. P. Eberhart.—p. 1582. Cont'n.
Heart Remedies. E. Hesse.—p. 1584.
Recent Works on Roentgen Diagnosis. L. Freund.—p. 1585.
The New Examination Regulations. Butterwack.—p. 1595.
Ancient Greek Obstetrics. N. Loures.—p. 1596.

Irritability During Sleep.—Peiper made plethysmograms of the brain during sleep in a girl after trephining and in a rhachitic boy. External stimuli caused regularly a brief increase in brain volume above normal, with smaller pulse; then a decrease in the volume below normal, lasting three to four times longer.

Occult Spina Bifida.—Altschul points out that many normal subjects have an occult spina bifida, while some of the enuresis patients are roentgenologically normal. The spina bifida indicates only a constitutional predisposition to the syndromes of myelodysplasia. External causes, which would not injure normal persons, produce enuresis and other symptoms in these subjects.

Wassermann's Tuberculosis Reaction.—Kretschmer and Bodenheimer conclude from the examination of 155 serums from tuberculosis of various forms, including sixty-four cases in children, that Wassermann's tuberculosis reaction is of no diagnostic use.

Decompressive Laminectomy.—Wolfsohn believes that laminectomy should be performed more frequently and earlier than is usual at present.

Prevention of Congenital Syphilis.—Levin's case demonstrates the necessity to treat during pregnancy every woman who has had syphilis at any time. A negative Wassermann reaction of both parents does not guarantee a nonsyphilitic baby.

Inclusions in Leukocytes in Grave Jaundice.—Blum observed vacuoles containing cholesterol esters in the polymorphonuclears, blood platelets and monocytes in an obese diabetic woman with jaundice from occlusion of the choledochus and cholangeitis.

Antipepsin of Blood Serum.—Einstein has modified the test for antipepsin of the blood serum. He found it in normal subjects, but not in patients with ulcer of the stomach. This confirms Katzenstein's theory of dysproportion between pepsin and antipepsin as a cause of ulcers.

Münchener medizinische Wochenschrift, Munich

71: 1561-1594 (Nov. 7) 1924

*Surgery of the Pancreas. E. v. Redwitz.—p. 1561.
*Treatment of Morphin Addicts. R. v. Hösslin.—p. 1567.
*Breathing and Physical Efficiency. E. Hämäläinen.—p. 1569.
*Virulence Test. E. Philipp.—p. 1571.
Antiphlogistic Action of Uric Acid. S. Levy.—p. 1572.
Marriage Permission and Disturbances of Sexual Functions. Liepmann.—p. 1573.
Epidemiology of Diphtheria. H. Schmidt.—p. 1575.
Perforation of Ulcer After Gastro-Enterostomy. J. Wymer.—p. 1576.
*Adipose-Genital Dystrophy After Emotion. S. Lützenkirchen.—p. 1577.
Physician and Social Insurance. Scholl.—p. 1578.

Surgery of the Pancreas.—Redwitz surveys the surgical aspects of pancreatic affections. A pain above the navel, radiating toward the left scapula or interscapular region, persisting intense pains in cancer of the body of the pancreas (Chauffards *syndrome pancréatico-solaire*), great tenderness at the right side of the navel, and sometimes a blue discoloration of the navel or lumbar region, give diagnostic hints. Deficient digestion of protein, fat and carbohydrates, and perhaps hyperglycemia, are important. Jaundice is observed in about one third of the patients. Hemorrhagic pancreatitis resembles ileus. Grave collapse occurs usually in spite of the good pulse. The affection may prove rapidly fatal. Surgery helps only if the hemorrhage has stopped, or if a cyst or suppuration develops. Spontaneous recovery may occur in about 10 per cent. of the acute cases. Immediate operation has a mortality of 50-60 per cent., depending on the general condition. The subacute forms may be injured by an operation. The diagnosis is difficult: One of Germany's greatest surgeons died from pancreatitis not diagnosed

before necropsy. Radical operation of cancer of the pancreas has an immediate mortality of 50 per cent., and none of the rest survived for more than five months. Cholecystoenterostomy is to be recommended in chronic pancreatitis, and may prolong life even with cancers. He never saw success of roentgen treatment of the latter. True cysts of the pancreas should be enucleated (10.7 per cent. mortality). If there are adhesions, the mortality rises to 55 per cent.

Treatment of Morphin Addicts.—Hösslin regrets that the laws make it impossible to treat morphin addicts against their will. Strict isolation with unpaid nurses (nuns), gradual withdrawal of morphin within from three to ten days, and combating of abstention disturbances with large doses of phenobarbital gave fair results. Recurrences are frequent; he has never yet encountered a patient who was not able to procure for himself as much morphin as he wanted. Cocain and alcohol addicts have abstention disturbances only for a day. Therefore, abrupt discontinuing of these drugs is possible.

Breathing and Physical Efficiency.—Hörnicke examined the type of breathing in 200 men. The inefficient subjects had a vital capacity of 1,500-3,000 c.c.; the respiratory volume was small, the diaphragm moved very little, and the respiration rate was 18-20 per minute. Those trained in sports had a deep diaphragmatic breathing, with 6-8 breaths per minute. He discusses the reasons why the latter type of breathing is rational.

Virulence Test.—Philipp never denied that the seat of the infection decides the prognosis. What he is seeking to understand is the cause why the germs attack such dangerous points. He is convinced that his method of determination of the virulence of the germs gives good prognostic hints. He refuses to operate for a cancer if the cervix contains virulent streptococci, or make a cesarean section in a woman in whose vagina he found such streptococci. He admits, however, that comparatively avirulent germs may cause death, for instance, by preventing the closure of the uterine wound.

Adiposogenital Dystrophy After Emotion.—Lützenkirchen's patient is a young woman who had headaches, polydipsia, frigidity, obesity and atrophy of the genital organs following quarrels with her husband, whom she had married against the will of her family. She recovered completely, except for some thirst, in a few months after being divorced and resuming marital intercourse with another.

Wiener klinische Wochenschrift, Vienna

37: 1157-1178 (Nov. 6) 1924

Prognosis After Resection of Gastric Cancer. H. Finsterer.—p. 1157. Cont'd.
*Infection and Addison's Disease. J. Sumijoshi.—p. 1161.
*Simplified Bassini Operation. W. Goldschmidt.—p. 1162.
Kidney Injury in Rugby Football. K. Haslinger.—p. 1163.
*Menstruation and Tuberculosis Immunity. M. Schur.—p. 1164.
*Encephalitis After Mumps. J. Mayrhofer-Grünbühel.—p. 1165.
*Secretion and Motor Function of Stomach. L. Hess and J. Faltitschek. —p. 1165. Conc'n.
Changes of Position of Uterus. J. Richter. Supplement.—pp. 1-12.

Infection and Addison's Disease.—Sumijoshi recalls Hansemann's opinion that tubercle bacilli can attack only damaged suprarenals. He believes that diphtheria and scarlet fever may be the predisposing cause, and quotes a few cases from the literature. His experiments have been negative so far.

Simplified Bassini Operation.—Goldschmidt recommends the Anschütz modification of Bassini's operation even in cases without adhesions. It is not necessary to isolate the sac of the inguinal hernia. He opens and sutures it only at the neck. The modification is simpler than Bassini's original method, has fewer recurrences, and avoids injury of the spermatic cord and the testis.

Menstruation and Tuberculosis Immunity.—Schur observed exacerbation of a previous tuberculin reaction at the onset of menstruation. The tuberculous rectal fistulas of the same patient became regularly inflamed during the period.

Encephalitis After Mumps.—Mayrhofer-Grünbühel observed in her community orchitis only late in the course of an epidemic of parotitis. Still later, four cases of encephalitis occurred, from two to four days after the parotitis.

Secretion and Motor Function of Stomach.—Hess and Faltitschek made paravertebral injections (Läwen) in various patients, and studied the secreting and motor functions of the stomach thereafter. The resulting increase in free and total acidity and in motility of the stomach corresponds to a paralysis of the splanchnic nerve and the predominance of the vagus. Pains were favorably influenced.

Zeitschrift für klinische Medizin, Berlin

100: 655-836 (Oct. 25) 1924

*Innocent Glycosuria. F. Umber and M. Rosenberg.—p. 655.
*Iron Therapy. W. Heubner.—p. 675.
*Palpitations in Hypertension. F. Kauffmann.—p. 677.
*Heat and Blood Pressure. F. Kauffmann.—p. 702.
*Basal Metabolism in Hypertension. M. Händel.—p. 725.
*Mineral Metabolism in Acidosis. H. Bernhardt.—p. 735.
*Malaria Treatment of General Paralysis. Schilling et al.—p. 742.
*Liver Injury by Phenylhydrazin Treatment. E. Levi.—p. 777.
*Schilling's Hemogram. F. Joseph.—p. 785.
Metabolism in Anemia After Transfusion. Weichsel.—p. 802.
*Roentgenology of Urinary Tract. Wichels and Behrens.—p. 815.
*Pulse and High Pressure Stasis. M. Reh.—p. 821.

Innocent Glycosuria.—Umber and Rosenberg discuss their findings in thirty-five patients with apparently harmless glycosuria. There is no way to exclude diabetes with certainty. They advise to refrain from a positive diagnosis until three years have elapsed. Pregnancy glycosuria belongs to this group, and acidosis on a diet free from carbohydrates does not exclude it. In spite of this, they observed a case of diabetic coma in a pregnant woman with all the signs of an "innocent glycosuria."

Iron Therapy.—Heubner found no resorption of trivalent iron from the intestine of dogs. Bivalent iron was resorbed.

Palpitations in Hypertension. — Kauffmann finds that patients with a permanent hypertension are frequently free from subjective disturbances. In contrast to this, patients with an unstable blood pressure complain of palpitations. He found that the second phase of the systole is shortened during palpitation. Lowering of the blood pressure by nitroglycerin shortens the whole systole, but causes a similar sensation. This palpitation is due to the changes in the peripheral vessels, while the palpitations in labile hypertension are of nervous origin if due to emotion. Otherwise they may be due also to changes of the blood vessels. The blood pressure may vary within a wide range in these patients, at very short intervals.

Heat and Blood Pressure.—Kauffmann found that many patients with essential hypertension are intolerant to heat, while the nephritic love it. He studied the blood pressure in a warm room, and found that it increased in the majority of the patients of the first group, and decreased in some of the second. Schlesinger had noted a similar paradoxic action of heat on the capillaries of the skin in some cases of intermittent limping.

Basal Metabolism in Hypertension.—Händel found frequently in permanent essential hypertension an increased basal metabolism rate. The rate in nephritic hypertension was almost normal.

Mineral Metabolism in Acidosis.—Bernhardt found a dose of 0.3 gm. of ammonium chlorid per kilogram of body weight as the maximum tolerated by adults without subjective disturbances. Acidosis and loss of calcium result. Rabl was able to soften the bones of children in a few days by giving 0.2 gm. of ammonium chlorid per kilogram, using Bier's passive hyperemia for eighteen hours daily on the affected extremity, and excluding light. After this the bone may be manipulated into the desired shape, and light and a diet rich in vitamins and calcium (except calcium chlorid) complete the cure.

Malaria Treatment of General Paralysis.—Schilling, Jossmann, Hoffmann, Rubitschung and Spek examined the blood changes in patients with general paralysis that were being treated with malaria. The shifting of the nuclei was constant. They believe that malaria treatment is the ideal of a nonspecific therapy on account of its marked pyrogenic action, rhythmic repetition and relative harmlessness.

Liver Injury by Phenylhydrazin Treatment.—Levi attributes the cirrhosis of the liver observed sometimes in polycythemia

to the destruction of red cells. The injury to the liver is increased by phenylhydrazin treatment.

Schilling's Hemogram.—Joseph publishes selected results of blood examinations to demonstrate especially the value of the qualitative differences in the neutrophils.

Roentgenology of Urinary Tract.—Wichels and Behrens recommend a 20-30 per cent. solution of strontium chlorid for cystopyelography. They believe that it is less liable to injure the patient than sodium bromid.

Pulse and High Pressure Stasis.—Reh attributes to the pulse wave the greater part of the transportation of blood in the arteries. The resistances to it depend on the ability of the arteries to dilate—not on their caliber. Loss of tonus of arteries causes a predominance of the blood transport by the stream instead of by the pulse wave. This is followed by increased pressure, and more work is thrown on the heart.

Zentralblatt für Chirurgie, Leipzig

52: 2407-2470 (Nov. 1) 1924

Division of Pylorus Muscle in Spastic Conditions. Payr.—p. 2407.
*Removal of Foreign Bodies from Esophagus. W. Anschütz.—p. 2416.
Perforating Peptic Ulcer in Meckel's Diverticulum. Brauser.—p. 2423.
*The Goiter Problem as I View It. E. Bircher.—p. 2427.
Results of Autopsytherapy. E. Makai.—p. 2429.
Operation for Exstrophy of the Bladder. Roloff.—p. 2432.

Removal Through the Cardia of Foreign Bodies Lodged in the Esophagus.—Anschütz emphasizes that foreign bodies may be removed through the cardia even though 11 to 15 cm. distant from the cardia, provided the diaphragm is raised as high as possible and the cardia is stretched to its full capacity. The distance of the impacted object from the teeth is no criterion of the distance of the foreign body from the cardia.

The Goiter Problem.—Bircher points out that manifestations of poisoning through iodin preparations used for goiter have increased to an alarming extent. Many such persons are going about with their condition unrecognized and untreated. There is as yet no iodin preparation that will insure absolute protection against iodin poisoning. Bircher urges that whenever an attempt is made to control goiter by the generalized use of salt known to contain an adequate amount of iodin, the public should be warned that symptoms of poisoning are not only possible but have frequently occurred. It would be unethical to be silent in regard to the dangers associated with such general and more or less uncontrolled medication. As the bearer of a goiter is not a menace to his fellow men, as are the tuberculous, forced medication is not indicated. Salt containing iodin must be plainly so marked.

Casopis lekaruv ceskych, Prague

63: 1621-1652 (Nov. 8) 1924

The Career and Death of Hlava.—This whole issue is devoted to the memory of Dr. Jaroslav Hlava. It contains tributes by various writers, a bibliography of his work, the report on his sickness and the necropsy findings.

Vestnik Roentgenologii i Radiologii, Moscow

3: 5-84, 1924

*Carcinoma of the Seminal Vesicles. M. I. Nemenoff.—p. 5.
*Action of Roentgen Rays on Sedimentation. Kochnevaia.—p. 13.
*Roentgenotherapy in Blood Diseases. A. Yougenburg.—p. 18.
Roentgen-Ray Diagnosis. M. I. Nemenoff.—p. 25.
*The Encephalography Question. V. V. Osinskaia.—p. 45.
Contrast Suspension in Bronchography. Reinberg and Kaplan.—p. 52.
*Acidity and Motility of Stomach. Oksenoff.—p. 61.
Pilocarpin and Gastric Motor Function. Oksenoff.—p. 64.
*Study of Normal Child Stomach. Arkussky.—p. 67.
*Dosage in Ultraviolet-Ray Treatment. Gassul.—p. 79.

Roentgenotherapy in Cancer of the Seminal Vesicles.—Nemenoff has encountered in the last four or five years thirteen cases of cancer of the seminal vesicles in subjects, aged from 22 to 57. Five patients out of eleven who were exposed to the roentgen rays recovered completely, while in three instances marked improvement was manifest after several days. Death occurred in three extremely grave cases. He exposes the abdomen, and the corresponding region of the spine, in four fields each, only one field a day. Sometimes also the scrotum and the inguinal region were exposed. Half a skin dose is used. The first course is followed by a second, two months later, if the tumor has not disappeared entirely; otherwise the treatment is repeated in three months. He asserts that the curative reaction to the roentgen rays is most evident in carcinoma of the seminal vesicles and its metastases. Roentgen-ray treatment should be applied without delay, as other measures, including operative removal, are futile.

Action of Roentgen and Radium Rays on Sedimentation.—Kochnevaia noted in forty-five patients with cancer increased speed of sedimentation of erythrocytes which was noted twenty-four hours after the exposure, and persisted for several days. The roentgen rays did not exert any action on sedimentation speed in vitro. The irradiations were followed by reduced viscosity of the blood in eighty subjects. In thirty-three instances, variations in the size of the erythrocytes paralleled the changes in viscosity. The changes in sedimentation speed are explained by the presence in the blood of products from destruction.

Roentgenotherapy in Polycythemia and Aplastic Anemia.—Yougenburg applied the roentgen rays successfully in two diametrically opposite diseases: A case of polycythemia, in a woman, aged 57, was markedly improved after irradiations of the long and the flat bones. A total of five skin doses was applied in seventeen days. Good results were also obtained in a woman, 57, with aplastic anemia, consecutive to repeated and grave hemorrhages from the nose. The spleen and the bones were exposed to the roentgen rays, and radium was introduced in the nose. It is assumed that the roentgen rays, while acting on the flat bones, affect also the endocrine glands, which control the hematopoietic organs.

Therapeutic Action of Gas Insufflation in Encephalography.—Osinskaia observed two cases which were diagnosed, one as a tumor of the cerebellum in a woman, aged 45, and the other, as epidemic cerebrospinal meningitis, in a girl, aged 12. The insufflation of gas into the skull and the removal of fluid resulted in recovery of the patient. It may be admitted that the supposed case of tumor was a circumscribed serous meningitis, in which the fluid exerted pressure on the right lobe of the cerebellum. An improvement from the encephalography procedure was evident also in three cases of epilepsy.

Gastric Acidity and Motor Function.—Oksenoff's research showed that no relation exists between acidity and motility in the stomach. In cases of hyperacidity, the motor function may be normal, or even increased. The evacuation in achylia is not accelerated. It seems, he says, that the position of the pylorus plays a more important part in stomach peristalsis than the acidity.

Clinical and Roentgen Picture of Normal Child Stomach.—Arkussky studied on 150 children, aged from 4 to 13, the gastric secretion by the method of introducing a narrow tube. Leaving this tube in a child's stomach, for one and a half to two hours, had very little effect on digestion and secretion. Hydrochloric acid and ferments were found in the fasting stomach in 69 per cent. of the children. The maximal secretion of the acid and of ferments occurred in the first thirty minutes after a carbohydrate meal in 79 per cent., and in thirty minutes after ingestion of milk alone in 51 per cent., and in forty minutes in 66 per cent. The amount of hydrochloric acid and of ferments is higher in children than in adults. The hook and the cow-horn shape of the stomach are equally frequent in older children. The shape of the stomach depends on the tonus. Evacuation of the stomach is more rapid in children than in adults. It depends on the tonus, the kind of food, and the appetite for the food, but not on the shape of the stomach.

Dosage in Ultraviolet-Ray Treatment.—Gassul's research on fifty-eight patients proved that the latent stage in the skin erythema from ultraviolet rays was the shortest in exophthalmic goiter (two hours), longer in lupus and pulmonary tuberculosis; and longest in sciatica (over six hours). The latency period was shorter in children from 7 to 14 than in children under 7, or in adults. The erythema was more pronounced with a higher (at least 20 or 30 per cent.) hemoglobin percentage. Fever increased the erythema. Marked erythema caused lowering of the blood pressure.

Further experiments suggest the importance of the skin in treatment, especially in tuberculosis.

Mitteil a. d. med. Fak. Univ., Tokio

22: 197-316 (Nov. 10) 1924. German Edition

Biochemical and Serologic Research on Hen's Eggs. S. Idzumi.—p. 197.
Hemolysins in Human Colostrum. M. Nakamura.—p. 217.
Quantitative Research on Human Colostrum. M. Nakamura.—p. 235.
Roentgenologic Study of the Sella Turcica. K. Takagi.—p. 251.
Teeth in Dermoid Cysts in Ovaries. T. Sannai.—p. 265.

Acta Chirurgica Scandinavica, Stockholm

57: 387-485 (Oct. 18) 1924

*Recurrence of Kidney Calculi. C. M. Rovsing.—p. 387.
Operation for Hallux Valgus. H. Olivecrona.—p. 396.
*Embolism of Mesenteric Artery. H. Olivecrona.—p. 403.
*Second Embolectomy in Same Patient. H. Olivecrona.—p. 411.
Research on Infectious Myositis. G. Holm.—p. 415.
Treatment of Chronic Pleural Empyema. S. Lundberg.—p. 451.

Recurrence of Kidney Calculi Due to Infection.—Rovsing bases his conclusions on 147 cases. He found that 71 per cent. of the recurrences of kidney calculi after operation were due to infections decomposing the urea. He prefers nephrotomy without drainage, and advises against pyelolithotomy as most often entailing a urinary fistula. The majority of cases of kidney stone operation followed by a fistula, even of short duration, have been infected by it, and generally with staphylococci. Bacteriologic examination of the urine from both ureters is the criterion for the operation for kidney calculi. With unilateral infection, with micro-organisms decomposing the urea, and where drainage cannot be avoided, nephrectomy is indicated. In bilateral infections, it is contraindicated.

Embolism of Superior Mesenteric Artery.—Olivecrona operated in a case of mesenteric vascular occlusion in a male, aged 73, with hypertension and lost compensation, sixteen hours after the acute onset, on the diagnosis of embolism and probable infarction of the small intestine. The small intestine was resected (3.4 m.). The improvement on the first day was succeeded by diarrhea, and death the third day. Necropsy revealed the embolus in the superior mesenteric artery. The special features were the sudden onset, intermittent nature of the pain, with supervening peritonitis, the extremely toxic condition, and the return of blood-stained lavage water. Tenesmus pointed to an affection of the large intestine, and might have been interpreted as suggesting occlusion of a mesenteric artery.

Second Successful Embolectomy in Same Patient.—The value of embolectomy is illustrated in a case in which within fourteen months the patient was twice operated on for embolism in the femoral artery. Both operations were successful, and no evidence of local disturbance of the circulation in the legs was manifest on reexamination six months later. Olivecrona advises to make the incision in the artery long enough to avoid unnecessary trauma.

Hospitalstidende, Copenhagen

67: 561-576 (Sept. 3) 1924

*Suprarenal Tumors and Pseudohermaphroditism. K. H. Krabbe.—p. 561.
Nystagmus Index During General Anesthesia. Borries.—p. 570.

Connection Between Suprarenal Tumor and Pseudohermaphroditism.—Krabbe reports another case which confirms anew the embryonal topical relation between the suprarenal cortex and development of sex glands. The new-born child had well defined labia and clitoris, with islands of suprarenal cortex tissue in one testis. The place of the second testis was taken by a tumor of suprarenal cortex tissue. Both suprarenals were aplastic and the infant presented in addition spina bifida and paralysis of the legs.

67: 597-612 (Sept. 17) 1924

*Permeability of Lupus Nodules. Haxthausen.—p. 597.
*Recurrence of Adenoid Vegetations. E. Bergh.—p. 604. Conc'n, p. 613.

Optic Conditions in Lupus Nodules.—Haxthausen has noticed that lupus nodule tissue is more transparent than normal skin to the chemically active rays. This allows the passage of from two to six times as much of these rays into the depths as are able to pass through normal skin.

Recurrence of Adenoid Vegetations.—Bergh has operated for adenoid vegetations in 2,251 cases since 1906, and has noted recurrence in only 3.6 per cent.

67: 629-644 (Oct. 1) 1924

*Striatal Syndromes with Congenital Brain Disease. Wimmer.—p. 629. Begun, p. 622.

Striatal Syndromes with Congenital Infantile Cerebral Affections.—In this fourth instalment of his study of extrapyramidal syndromes, Wimmer describes a case of pallidal rigidity, with certain elements of Little's disease, in a boy of 19. There were no signs of pyramidal disease, the symptoms being exclusively of the striatal type. In a second case, the congenital striatal symptoms were restricted to the right side.

67: 645-660 (Oct. 8) 1924

*Diagnostic Import of Choked Disk. V. Christiansen.—p. 645. Conc'n, p. 661.
Picro-Eosin Modification of Gieson Stain. Jensen.—p. 659.

Diagnostic Importance of Choked Disk.—Christiansen tabulates the details in regard to the disk, visual acuity, visual field, atrophy and comment in twenty-eight cases of brain tumor. These are selected from a total of 220 brain tumor cases since 1917. He never observed choked disk as the only symptom of a brain tumor; when it occurs isolated, it is merely a sign of optic neuritis of toxic or infectious origin. When it is found with headache, dizziness or other cerebral symptom it stamps as a serious disturbance what might be lightly regarded otherwise. The degree of congestion is of minor importance. The ophthalmologists are not always able to distinguish between the early stages of choked disk and conditions within the normal range. The appearance first in one eye and the local intensity do not justify conclusion as to the site of the tumor on that side. In one case the visual acuity persisted unimpaired for three years after the choked disk had been discovered, explained by a large tumor in the cerebellopontile angle. In about 50 per cent. of tumors in the motor region, there was no choked disk, and in a number there were no general brain symptoms, the motor symptoms alone revealing the lesion early. Choked disk is practically constant with a tumor in the occipital lobe or pontine angle. With a cerebellopontile tumor, the deafness is usually ascribed to other causes until choked disk has had time to develop. Another factor which cooperates in postponing detection of the tumor is the peculiar tolerance of the motor cranial nerves to the encroachment of even large tumors. Necropsy may reveal the facialis and abducent nerves embedded in a tumor when there had been no symptoms from these two nerves. In one case of cerebellopontile tumor, trigeminal neuralgia was the first symptom, but this is exceptional with these tumors, while neuralgia is frequent with tumors in the gasserian ganglion region. Choked disk throws no light on the site or nature of the tumor, but it reveals that the lesion has passed beyond the purely local phase. Among his other practical conclusions from his analysis is the warning that nothing but a direct attack on the tumor should be considered with symptoms indicating involvement of the basal optic nerve but no choked disk. On the other hand, when there is choked disk, there is always a hope that a decompressive operation may arrest the degeneration of the optic tract.

67: 661-676 (Oct. 15) 1924

*Anthrax from Shaving Brush. O. Thomsen and V. Jensen.—p. 672.

Anthrax from Shaving Brush.—The victim in the case reported was Dr. V. Ellermann, professor of legal medicine, who died Sept. 24, 1924, the sixth day after a small lesion had developed on the cheek. It proved to be malignant anthrax. It was traced to a new shaving brush which he had used himself for two weeks before his illness. The brush was of Chinese horse hair, and contained anthrax spores. This report of the case is published at the request of the public health authorities, and measures to sterilize the shaving brushes are advocated. For this it is recommended to wash with a little soda and then place in a weak solution of formaldehyd, keeping the heat at 40 or 50 C. and thoroughly rinsing in water. Shaving brushes are usually unable to stand hard boiling.